



**Qatar Islamic Archaeology and Heritage Project**  
**End of Season Report : Stage 2, Season 1, 20092010**

Richter, Tobias; Nymann, Hanne

*Publication date:*  
2011

*Document version*  
Publisher's PDF, also known as Version of record

*Citation for published version (APA):*  
Richter, T., & Nymann, H. (Eds.) (2011). *Qatar Islamic Archaeology and Heritage Project: End of Season Report : Stage 2, Season 1, 20092010*. University of Copenhagen and Qatar Museums Authority.

# **Qatar Islamic Archaeology and Heritage Project**

## **End of Season Report Stage 2, Season 1**

2009-2010

Furayhah

Al Zubarah

Murayr





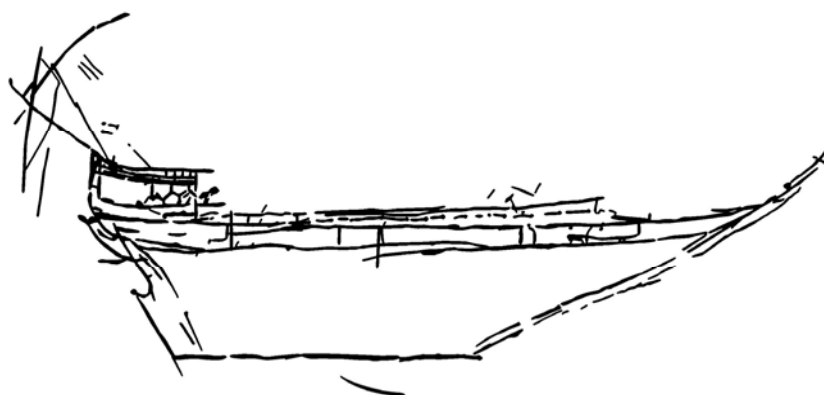




## **Qatar Islamic Archaeology and Heritage Project**

# **End of Season Report**

**Stage 2, Season 1, 2009-2010**



**Project Directors:** Alan Walmsley and Ingolf Thuesen

**Director of Archaeology and Heritage for QMA:** Sultan Muhesen

**Edited by:** Tobias Richter

**With contributions from:**

Thomas Collie, Anthony Grey, Michael House, Richard Humphreys, Moritz Kinzel David Mackie,  
David Meier, Hanne Nyman, Gareth Rees, Tobias Richter, Paul Wordsworth, Deniz Yesin-Meier,  
and Lisa Yeomans

**Photographs by:** Alexis Pantos

**Finds Illustrations by:** Caroline Hebron



**The executive and staff of the Qatar Islamic Archaeology and Heritage Project  
acknowledge and appreciate the perceptive leadership and considerable support of:**

**Her Excellency Sheikha Al Mayassa Bint Hamad Bin Khalifa Al-Thani**  
*Chairperson of the QMA*

**His Excellency Sheikh Hassan Bin Mohammad Bin Ali Al-Thani**  
*Vice-Chairperson of the QMA*





## Acknowledgements

**Engineer Abdullah Al-Najjar**

*CEO of QMA*

**Earl Roger Mandle**

*QMA Executive Director*

**Professor Sultan Muhesen**

*Director, Department of Archaeology and Heritage, QMA*

**Mr. Faysal al-Na'imi**

*Head of Archaeology Section, QMA*

**Ms. Himyan Jassim Al-Kuwari**

*International Communications & Relations Consultant, QMA*

**Mr. Sayf al-Na'imi**

*Archaeology Section, QMA*

### **The QIAH 2009-2010 Crew Members:**

*Jennie Barrett-Sanchez, Agnieszka Bystron, Katherine Campbell, Erin Estrup, Benjamin Fabre, Charlotte Faiers, David Fallon, Kerrie Grant, Christopher Hawksworth, David Meier, Victoria Morgan, Holly Parton, Sabrina Salmon, Daniel Wheeler, and Deniz Yesin-Meier*



## *Table of Contents*

<b>1. Introduction</b> <i>by Tobias Richter, Alan Walmsley &amp; Ingolf Thuesen</i>	<b>12</b>
<b>2. Historical Background and History of Research</b> <i>by Tobias Richter, Alan Walmsley &amp; Hanne Nyman</i>	<b>15</b>
2.1 INTRODUCTION	15
2.2 HISTORICAL BACKGROUND	15
2.2.1 The development of Zubarah as described in written and Cartographic Sources	15
2.2.2 Zubarah and the Pearling Industry	21
2.2.3 Zubarah's Hinterland	21
2.3 RESULTS OF PREVIOUS EXCAVATIONS	27
2.3.1 Qatar Museums Authority Excavations 1980	27
2.3.2 Qatar Museums Authority Excavations 2002-2003	27
2.3.3 Aerial Photographs	28
2.4. SUMMARY AND CONCLUSIONS	28
<b>3. Research Questions and Objectives</b> <i>by Tobias Richter, Richard Humphrey, Michael House, Tom Collie, Philip Macumber, Gareth Rees &amp;</i>	<b>29</b>
3.1 INTRODUCTION	29
3.2 EXCAVATIONS IN AL ZUBĀRAH	29
3.2.1 ZUEP01	29
3.2.2 ZUEP02	31
3.2.3 ZUEP03	32
3.2.4 ZUEP04	33
3.3 SURVEY AND EVALUATION AT QAL <sup>C</sup> AT MURAYR	34
3.4 SURVEY AND EVALUATION AT QAL <sup>C</sup> AT FURAYHAH	34
3.5 REGIONAL SURVEY	35
3.6 GEOMORPHOLOGICAL SURVEY	36
3.7 RESEARCH QUESTIONS AND OBJECTIVES: CONCLUSION	36
<b>4. Methodology</b> <i>by Tobias Richter, Richard Humphrey, Michael House, Tom Collie, Gareth Rees &amp; David Mackie</i>	<b>37</b>
4.1 INTRODUCTION	37
4.2. OPEN AREA EXCAVATION	37



*Table of Contents (cont.)*

4.3. EXCAVATION METHODOLOGY	37
4.4. REGIONAL SURVEY METHODOLOGY	38
4.5. SUMMARY	39
<b>5. Geomorphology and Geoarchaeology by Philip Macumber</b>	<b>41</b>
5.1 INTRODUCTION	41
5.2 DATING THE MID-HOLOCENE TRANSGRESSION/REGRESSION AT AL ZUBARĀH	42
5.2.1 Environmental Setting	42
5.2.2 Radiocarbon Dates	44
5.2.3 Discussion of Radiocarbon Dates	48
5.3 THE LANDSCAPE BETWEEN AL ZUBARĀH AND AL JUMAYL	52
5.4 INTERNAL DRAINAGE PATTERNS AND NEAR-COASTAL EMBAYMENTS	59
5.5 WETTER CLIMATE DURING THE LAST INTERGLACIAL (EEMIAN)	60
5.6 CONCENTRATION OF GROUNDWATER OUTFLOW INTO EMBAYMENTS	63
5.7 THE SUMAYSIMAH EXAMPLE	63
5.8 OCCUPATION IN THE AL ZUBARĀH-SHAMAL REGION AND ITS HINTERLAND	68
5.8.1 The distribution of settlements in the area between Al Jumayl and Al Zubarāh	68
5.8.2 Irrigation areas supporting the coastal settlements	72
5.8.3 Non-coastal sites	75
5.8.3 Relief as a factor in early occupation	76
5.9 CONCLUSIONS	80
<b>6. Excavations in Al Zubārah</b>	<b>85</b>
6.1 ZUEP01 (by Richard Humphrey)	85
6.1.1 Introduction	85
6.1.2 Natural Deposits	85
6.1.3 Phase 6: Temporary Occupations	90
6.1.4 Phase 5: Main Construction and Occupation Phase of Compounds	90
6.1.5 Phase 4c: Abandonment/collapse/infill	110
6.1.6 Phase 4b: Reoccupation	111
6.1.7 Phase 4c: Abandonment/ Infill stratigraphically sealing reoccupation	111

*Table of Contents (cont.)*

6.1.8 Phase 3: City Wall and Tower	113
6.1.9 Phase 2: Late beachstone walls and pits	114
6.1.10 Phase 1: Overburden	115
6.1.11 Concluding Remarks and Recommendations for Further Work	115
6.2 EXCAVATIONS IN ZUEP02 <i>(by Michael House)</i>	118
6.2.1 Introduction	118
6.2.2 Northeastern Excavations Area - Road/street & Northeastern Complex	120
6.2.3 The Western Central Area (Area II) - Including the Northwest corner of the phase 03 compound	132
6.2.4 The Eastern Central Area (Area III)	141
6.2.5 The Southeastern Area (Area IV)	147
6.2.6 ZUEP02 - Phase Summary	162
6.2.7 Conclusions and Recommendations	163
6.3 EXCAVATION POINT THREE <i>(by Tom Collie)</i>	165
6.3.1 Introduction	165
6.3.2 Phase 6	167
6.3.3 Phase 5	170
6.3.4 Phase 4	173
6.3.5 Phase 3: Abandonment	176
6.3.6 Phase 2: Construction and Ruin	176
6.3.7 Phase 1: Modern	184
6.3.8 Conclusion and Recommendations	185
6.4 ZUBĀRAH EXCAVATION POINT 04 <i>(by Tom Collie)</i>	187
6.4.1 Introduction	187
6.4.2 Phase 4: Pre-Compound Construction	190
6.4.3 Phase 3: Compound Construction	190
6.4.4 Phase 2: Occupation	197
6.4.5 Phase 1 - Collapse	212
6.4.6 Conclusions and Recommendations	213

*Table of Contents (cont.)*

<b>7. Qal'at Murayr</b> <i>by Gareth Rees</i>	<b>215</b>
7.1 INTRODUCTION	215
7.2 TOPOGRAPHY AND SETTING	215
7.3 THE SURVEY	217
7.3.1 The Fort and Associated Features	217
7.3.2 The Outer Wall	220
7.3.3 Internal Structures	220
7.4 TRENCHES MUEP01 AND MUEP02	222
7.4.5 Trench MUEP08	222
7.4.6 Trench MUEP03	227
7.4.7 Trench MUEP04 and MUEP07	234
7.4.8 Associated Features	239
7.5 FEATURES TO THE SOUTH AND WEST OF THE FORT COMPLEX	239
7.5.1 Western Enclosures	239
7.5.2 Buildings	243
7.5.3 Trench MUEP06	243
7.5.4 Outlying Building	247
7.5.5 Wells	247
7.6 SOUTHERN AREA	249
7.6.1 Western, north eastern and southern enclosures	249
7.6.2 Buildings	252
7.6.3 Wells	252
7.7 THE CEMETERY	253
7.8 LANDSCAPE REMODELLING	255
7.8.1 Mechanical disturbance	255
7.8.2 Quarrying	255
7.9 OTHER FEATURES	257
7.9.1 Linear Features	257

*Table of Contents (cont.)*

7.9.2 Pottery Spreads	257
7.9.3 Shell Deposits	257
7.9.4 Walls	259
7.10 DISCUSSION	259
<b>8. Furayhah</b> <i>by Gareth Rees</i>	<b>261</b>
8.1 INTRODUCTION	261
8.2 TOPOGRAPHY AND SETTING	262
8.3 THE SURVEY	263
8.3.1 Buildings	263
8.3.2 Qal'at Furayhah	266
8.4 THE MOSQUE	271
8.4.1 FREP01	271
8.5 BUILDINGS TO THE EAST	278
8.5.1 FREP03	278
8.6 MIDDENS	284
8.7 FREP02	289
8.8 CEMETERIES	293
8.8.1 Southern Cemetery	293
8.8.2 Northern Cemetery	293
8.9 FISHTRAPS	293
8.10 OTHER FEATURES	295
8.10.1 Well	295
8.10.2 Beach Clearance	295
8.10.3 Excavation	295
8.10.4 Bulldozing	295
8.11 INTERPRETATION AND DISCUSSION	296
<b>9. Regional Survey Report</b> <i>by David Mackie</i>	<b>297</b>
9.1 INTRODUCTION	297



*Table of Contents (cont.)*

9.2 NEWLY IDENTIFIED SITES	297
9.2.1 Temporary camps	297
9.2.2 Cemetery sites	300
9.2.3 Grave clusters	302
9.2.4 Settlements	302
9.2.5 Structural features	302
9.2.6 Wells	304
9.2.7 Dumps	308
9.2.8 Enclosures	308
9.2.9 Boundaries	308
9.2.10 Cleared areas	308
9.2.11 Cairns	311
9.2.12 Salt extraction	311
9.2.13 Hides	311
9.2.14 Bulldozer/machine cuts	311
9.3 SITES PREVIOUSLY RECORDED	314
9.3.1 Enclosures	314
9.3.2 Beach clearance	314
9.3.3 Cemeteries	317
9.3.4 Grave cluster	317
9.3.5 Earthworks	317
9.3.6 Wells	319
9.3.7 Forts	323
9.3.8 Settlements	323
9.3.9 Structural features	327
9.3.10 Fish traps	327
9.3.11 Dumps	331
9.3.12 Cleared areas	331

*Table of Contents (cont.)*

9.3.13 Other features	335
9.3.14 Rock outcrops	335
9.4 SUMMARY	339
<b>10. Conservation and Preservation</b> <i>by Moritz Kinzel &amp; Ingolf Thuesen</i>	<b>342</b>
10.1 INTRODUCTION	342
10.2 MASTER PLAN	343
10.3 PRESERVATION	343
10.4 WORK CARRIED OUT IN 2009/2010	343
10.5 CONSERVATION EXPERIMENTAL WORK	348
10.6 MOULDING OF A DECORATED PLASTER FRAGMENT AND THE DHOW-ETCHING IN ZUEP01	350
10.5 CONSERVATION MEASUREMENTS	354
10.6 MANAGEMENT	354
10.7 PRESENTATION	354
<b>11. Summary and Conclusions</b> <i>by Tobias Richter &amp; Alan Walmsley</i>	<b>355</b>
11.1 INTRODUCTION	355
11.2 RESEARCH QUESTIONS	355
11.3 SUMMARY OF KEY FINDINGS	359
11.3.1 Archaeological Phases of Zubārah	359
11.3.2 The 'Palatial Compound' and Social Stratification	362
11.3.3 Pearl fishing and trade	362
11.3.4 Zubārah's Hinterland	364
11.3.5 Zubārah's Importance	365
11.4 RECOMMENDATIONS	366
<b>12. Bibliography</b>	<b>367</b>
<b>Appendices (CD Content)</b>	
APPENDIX I: CERAMIC TYPE SERIES DESCRIPTION (by Anthony Grey)	
APPENDIX II: PRELIMINARY ANIMAL BONE REPORT (by Lisa Yeomans)	

*Table of Contents (cont.)*

---

APPENDIX III: PRELIMINARY REPORT ON THE ETHNOARCHAEOLOGICAL INVESTIGATIONS AT THE ABANDONED VILLAGE OF AL-AREESH ON THE NORTHWEST COAST OF QATAR (by Deniz Yesin-Meier & David Meier)

---

APPENDIX IV: REGISTER OF ARCHAEOLOGICAL CONTEXTS FROM AL ZUBARAH

---

APPENDIX V: FIELD OBJECT CATALOG

---

APPENDIX VI: ZUBARAH STATE OF PRESERVATION OUTER CITY WALL 2009

---

APPENDIX VII: ZUBARAH 2009 CATALOG SOUTHFIELD

---

APPENDIX VIII: MOLDING OF DRAWING OF BOAT & CONCEPTION OF RESTORATION OF THE WALLS

---

APPENDIX IX: STRATIGRAPHIC MATRIX ZUEP01

---

APPENDIX X: STRATIGRAPHIC MATRIX ZUEP02

---

APPENDIX XI: STRATIGRAPHIC MATRIX ZUEP03

---

APPENDIX XII: STRATIGRAPHIC MATRIX ZUEP04

---

# 1. Introduction

*Tobias Richter, Alan Walmsley and Ingolf Thuesen*

This report describes the results of the archaeological fieldwork and associated research conducted during Stage 2 of the Qatar Islamic Archaeology and Heritage Project (QIAH). QIAH was launched in 2008 on the initiative of HE Sheikh Hassan Bin Mohammad Bin Ali Al-Thani, Vice-Chairperson of the Qatar Museums Authority (QMA), and carried out on QMA's behalf by the Institute for Cross-Cultural and Regional Studies at the University of Copenhagen. The project is co-directed by Professor Alan Walmsley (Archaeology) and Professor Ingolf Thuesen (Conservation and Heritage Management). Stage 2 follows on from QIAH Stage 1 carried out at Al Zubārah from January 2009 to May 2009, which was covered in QIAH *End of Season Report, 2009* (Bille 2009).

The overall objective of the project, as outlined in QIAH *Initial Proposal and Concept Plan* (Document no. QIAH-101, Nov. 15<sup>th</sup> 2008), is to undertake a multi-scalar archaeological research and heritage management project in and around Al Zubārah. The aims are to reconstruct past life-ways during the Late Islamic period in northwest Qatar, preserve archaeological and heritage sites in the project's area of responsibility, and prepare a heritage and tourism management plan in advance of creating a Zubārah archaeological park and nomination of the site for the UNESCO World Cultural Heritage list.

The present report is primarily concerned with the archaeological research component of this project, but does include additional reports on conservation activities carried out during this season and touches upon other elements of QIAH where required. The 2009/2010 season had seven primary, interconnected components which are covered in this report:

- Geomorphological survey (Section 5)
- Excavations in Al Zubārah (Section 6)
- Mapping and test excavations at Qal'at Murayr (Section 7)
- Mapping and text excavations at Al Furayhah (Section 8)
- Regional archaeological survey (Section 9)
- The Zubara Archaeological Park as UNESCO World Cultural Heritage (Section 10)

The research area centres on the abandoned Islamic town of Al Zubārah and the surrounding historic landscape. Al Zubārah is situated on the northwest coast of Qatar at 25°58'.44N/ 51°01'.33E (Figure 1). The archaeological study area encompasses all of northern Qatar, in which we examine Islamic sites in the hinterland of Zubārah and beyond, as requested by QMA. Only part of this zone has been studied as part of this season (see Section 9). Other parts of this area have already been investigated by other projects, including the University of Birmingham's remote sensing and landscape survey particularly south of the Zubārah – Ras Ushayriq road, the French mission's work at Murwab, as well as the University of Wales (Lampeter) excavations at Ruwaida.

Geographically speaking the study region is today in an arid, desert zone that receives less than 50 mm of mean annual rainfall (even in the wettest month of the year between December and February



rainfall rarely amounts to more than 35 mm each month). This is therefore a true desert environment with temperatures ranging from a maximal average of 20°C (10°C minimum) in the winter to a maximal average of 45°C (min 25°C) in the summer months. Little natural vegetation is present in the local landscape, composed largely of shrubs, short-lived wild grasses, and some occasional trees. During, and for a few weeks after the winter season, various green patches of localized vegetation emerge. The local geology is composed largely of middle Eocene dolomite limestone of the Damman Formation, although Lower Eocene limestone and dolomites of the Rus Formation exist toward al-Khor and the central part of northern Qatar. Soils in the study area are more variable with various sand and loam deposits dominating. A particularly important geographical feature is the coastline and its associated environments. The present coastline settled into its current location c. 1,000 B.C., as outlined in Macumber 2009. The foreshore and shore consists of a shallow, sandy beach with occasional mangroves, and supratidal salt flats (*sabkha*). The coast and its environs played an important role in the composition of the local settlement pattern and the emergence of villages and towns which depended to a great extent on marine resources. The other critical element for human settlement in the region is the access to and availability of water. These geographical and geomorphological aspects are discussed in more detail in Philip Macumber's report (see section 6).

The fieldwork season lasted from November 1<sup>st</sup> 2009 to March 31<sup>st</sup> 2010 and involved a 22-28 strong team of archaeologists and specialists at any one time. Fieldwork was carried out six days a week with the assistance of, on average, 50 workers supervised by qualified and experienced staff. The crew was sub-divided into six teams, each supervised by an experienced senior archaeologist: 3 excavation teams in Al Zubārah, 1 mapping and test excavation team for Qal'at Murayr and Furayhah, 1 regional survey team, and 1 laboratory team (responsible for finds cleaning and analysis, and data entry).

While excavations at Al Zubārah were the main focus of the 2009/2010 season, with more than 50% of the staff deployed there, field research was also carried out in the region around Al Zubārah. Two sites close to Al Zubārah – Qal'at Murayr and Furayhah – were subjected to an intensive non-invasive mapping survey, as well as limited test excavations. A regional survey was carried out to discover and record new sites north and east of Al Zubārah and to cross-check and verify known sites recorded in the Qatar National Historic Environment Record (QNHER) database. This survey was supplemented by a geomorphological assessment of the region around Al Zubārah to gain a better understanding of the natural and anthropogenic processes involved in the formation of the physical landscape and the distribution of natural resources.

This report will first briefly outline the historical background against which this project is carried out, describing the written sources, historical context and previous excavations carried out in Al Zubārah and the immediate surroundings. Based on this historical background it will outline the research questions and objectives for each project component and excavation area, before describing the methods used for excavation and surveys. The main section describes the results of the field research in each excavation area and project component. After this there follows a report on the conservation efforts at Al Zubārah. The report concludes with a discussion of the research results and recommendation for further work.

The appendices provide a wealth of additional information about the archaeological research. Here, a description and analysis of the ceramic finds from the site is provided, a preliminary analysis of fau-

nal remains, preliminary study of Al Arish, appendices reporting on conservation and catalogues of archaeological contexts and finds. These are provided as a digital resource on CD-Rom. The Arabic translation provides a summary of the key findings and results for each of the project components, with more technical details confined to the English report.

This project has significantly enhanced our understanding and knowledge of the city of Al Zubārah and its hinterland, expanding significantly on previously conducted research at Al Zubārah. The four excavation areas provide an insight into the development and spatial organization of the town during the mid 18th and early 20th century. They revealed the remains of somewhat affluent (merchant?) courtyard houses in ZUEP01, evidence for road and passageway alignments and a commercial district in ZUEP02, the remnants of temporary tent camps in ZUEP03, and a ‘palatial’ compound in ZUEP04. Fieldwork at Qal‘at Murayr has demonstrated the high level of preservation of the former fortified structure, which was connected to Al Zubārah by two screening walls. Survey and test excavations at Furayhah, likewise, revealed the remains of a mosque and evidence for a phase of settlement that likely pre-dates the main occupation at the site. The regional survey succeeded in discovering multiple new archaeological sites, while checking known sites on the ground against the existing sites and monuments database. Geomorphological work obtained crucial data on our understanding of the local settlement pattern and the water resources in the local environment. Our work on the material culture from the 2009 and this season has begun to provide us with a better understanding of the economic connections and trade links between Al Zubārah and other Arabian Gulf ports as well as the wider world, and has begun to define the differences between different households in Al Zubārah’s society. A similar perspective is beginning to emerge from the study of faunal remains. Both, the analysis of material culture and faunal remains will have to be intensified in the future to gain a more nuanced understanding of Al Zubārah’s social fabric and economic relations. Our initial conservation feasibility study (reported in Section 10) has taken the first steps to elucidate the processes of architectural and structural decay at the site and has begun to investigate ways by which Al Zubārah’s historic fabric can be preserved for future generations.

Overall, Stage 2, Season 1 has made outstanding progress and has provided new key insights into the history of Al Zubārah, thereby shining new light on the little explored cultural history of Qatar.

## 2. Historical Background and History of Research

*Tobias Richter, Alan Walmsley & Hanne Nyman*

### 2.1 Introduction

This section provides a concise historical background to the project, outlining what is known from historical sources about Al Zubārah and its hinterland, the regional context, as well as the results of previous excavations carried out at the site. While there has been a considerable amount of research into Al Zubārah and its hinterland, many aspects of the settlement's emergence, development and ultimate demise are still not well understood. It is also clear from the existing written and other sources that there is a lack of detailed description of the settlement and its environs. Written sources also focus in particular on the lives and actions of particular individuals and rulers, but provide little insight into the lives of ordinary, everyday people. As is common with written sources, scholars are at the whims of the original authors and their texts reflect their choices about what they deemed significant or relevant to describe. Archaeology therefore has a critical role to play in providing a fuller, more colourful picture of the past and the historical development of Qatar's most prominent archaeological site.

At the same time, written sources and associated material provide critical insights and detail to inform our understanding of archaeological contexts. The following discussion focuses at this stage on material that was found to be readily available and largely written in English. A full study of the relevant Arabic sources is currently in progress and will hopefully provide further significant insights into our understanding of Zubārah in the future. It is worth pointing out that many of the sources discussed below do refer to original texts and Arabic sources and do thus reflect not just an 'outsider', western view, but do also provide an Arab perspective to a certain degree.

### 2.2 Historical Background

#### 2.2.1 The development of Zubarah as described in written and Cartographic Sources

There remains some confusion of the earliest mentioning of Al Zubārah in written documents. Most sources point to an origin of Al Zubārah during the mid 18<sup>th</sup> century, suggesting that it first emerged with the arrival of the Utoob. It is important to point out that the site of Furayhah – also investigated as part of this project (see Section 8) – pre-dates Zubārah according to most written records (see e.g. Rahman 2005), but was eclipsed by Zubārah for some time during the mid to late 18<sup>th</sup> century. One of the earliest, more detailed maps of the region, was drawn by Carsten Niebuhr as part of his travels in the region. This map (Figure 2.1) does not show a settlement at Zubārah. However, given the state of cartography at the time it would not be surprising if this is an omission (Qatar for example is depicted as being an island rather than a peninsula). Written sources commonly place the founding of Al Zubārah in the middle of the 18<sup>th</sup> century and relate it to the arrival of the al Utoob in Qatar (Khalifa and Hussain 1993, Rahman 2005, Hakima 1965).

Khalifa and Hussain (1993: 303-304) date the founding of Al Zubārah to 1762 A.D. before the conventional date of 1766 A.D. Although this contradicts the lack of a depiction of Zubārah on the



**Figure 2.1:** Map of the Qatar peninsula showing location of Al Zubārah

Niebuhr map (dated 1765 A.D.), this may simply reflect a time-lag between the founding of Zubārah and the production or publication of the map. However, if Niebuhr's map reflects an accurate picture of the area in 1765 A.D. – by which point Al Zubārah would have been in existence for three years if the 1762 AD date is assumed – than the 1766 A.D. date for the founding of Al Zubārah may be more correct. At the same time, the map also lacks resolution and detail, and errs on certain details, so that it cannot be entirely relied on as a source. At this point, what we can assume is that the Utoob arrived in Al Zubārah sometime between 1762-1766 A.D. and that at least the major phase of expansion of the settlement occurred then. However, some references suggest that the Utoob “arrived and took control over Zubārah” (Khalifa and Hussain 1993: 303), which could indicate that there was already a settlement established here prior. The origins of Zubārah are an important point that can be investigated archaeologically in lieu of having other archaeological sources.

Different reasons are given for the Utoob migration from Kuwait to northwest Qatar. One suggestion is that there were significant rivalries between members of the 'Utoob group and other families in the Basra and Kuwait area, prompting the former to leave for Qatar (Khalifa and Hussain 1993: 302-304, Rahman 2005). Be this as it may, the waters around Qatar and Bahrain were well known for their rich pearl banks, and their exploitation locally was very likely one if not the main reason for the Utoob to leave Kuwait and head for Qatar. The Utoob appear to have been widely known as some of the best mariners in the Gulf and would have undoubtedly been aware of suitable harbours and pearl banks in the region, including the western coast of Qatar (Hakima 1965: 67).

The move from Kuwait was driven by Sheikh Muhammed bin Khalifa who led a faction of the Utoob (others remained in Kuwait) to Al Zubārah (Khalifa and Hussain 1993, 302; Hakima 1965, 67). The Khalifa's decision to leave was not a sudden flight from Kuwait, but was likely a well planned expansion. Sheikh Muhammed bin Khalifa is said to not only have instigated the construction of the town, but also the fort of 'Marir' (Qal'at Murayr). The date of construction for the latter site, situated 1.65 km east of Al Zubārah, and linked to it by its two screening walls (see Section 7, Figure 2.5), is given as 1768 A.D. Both the construction of Qal'at Murayr and Al Zubārah could, therefore, be seen as quite a bold, strategic execution of a planned town. It is unclear, however, whether the al-Khalifa's expanded an existing settlement at Zubārah or founded the town from scratch. Qal'at Murayr's construction was driven by strategic and safety concerns since although the local Al-Musallam tribe were at first not opposed to the settlement of the Utoob, relations between them and the Utoob soon deteriorated. In response to this deterioration in relations the Utoob constructed Qal'at Murayr (Hakima 1965). This shows that Al Zubārah's fortifications were not just for show, but fulfilled serious defensive functions.

Following the arrival of the al-Khalifa's Al Zubārah began to flourish quickly partially due to the influx of merchant families from elsewhere in the Gulf. These merchants arrived in Al Zubārah largely from Kuwait and Basra after the latter was occupied by Persian forces in 1775-1776 A.D. However, merchants also settled in Zubārah coming from other parts of the Gulf. One appeal of Zubārah was that trade was “duty-free” here, so that Zubārah's offered great economic incentives. Being also situated very close to the pearl banks around Bahrain and northern Qatar, these two economic stimuli were important attractions for traders, enhancing the regional standing of the town as a major trading centre. Basra's demise at this time was compounded by the plague which ravaged the settlement during the early 1770s A.D., killing many of the town's inhabitants. Although the plague is also said to have hit Al Zubārah in 1767 A.D. and 1782 A.D. (Khalifa and Hussain 1993, 304), Al Zubārah at

this time nevertheless eclipsed many other settlements in the region. Several armed confrontations with neighbouring tribes and factions did little to deter Al Zubārah's rapid rise to regional prominence, although it was exactly this rapid rise that drew others to try seize or raid the town.

The Gulf was a fairly unstable geographical entity politically during the late 18<sup>th</sup> century, with both Persia and Oman, as well as Dutch and British trading companies, vying for control of the region. Al Zubārah and other parts of the Arabian Gulf littoral were often caught between the front lines. It is clear that Al Zubārah's town wall and towers as well as Qal'at Murayr – placed at a strategic position overlooking the town and protecting the fresh water wells – were not just built for show. Rather, they reflect the very real concern for protecting oneself against attacks. By the 1770s Al Zubārah had become the largest settlement in Qatar and continued to benefit from the pearl trade. Lorimer has said that at the time of Zubārah's existence up to twenty 'forts' existed within and in the vicinity of Al Zubārah, including Furayhah, Halwan, Lisha, 'Ain Muhammed, Qal'at Murayr, Rakaiyat, Umm al-Shirwail and Thaghab (Lorimer 1908, 1533-34; Hakima 1965, 69). However, since Lorimer wrote numerous years later, it is unclear whether these forts really were all contemporary with the main phase of settlement at Zubārah. Lorimer (1908) also describes the existence of a channel at Zubārah, which is said to have linked the sea to Qal'at Murayr and enabled small boats to carry goods from the sea to the fort and vice versa.

Khalifa and Hussain (1993, 315) also provide the only available description of Qal'at Murayr. They describe the fort as having "three big towers in each direction with gun-placements in them." The fort also contained a mosque near the gate, as well as a fresh-water well. They also describe how, following the initial construction, two 'screening walls' were built connecting the outer town wall of Zubārah with the fort, with a road running between the two. The mosque near the main gate of the fort was apparently domed and had an audience hall nearby. Khalifa and Hussain (1993, 315) recount that there were between 35-60 houses situated inside the fort, as well as date palm trees and wells. The perimeter wall of the fort was apparently wide enough to allow six men to walk on it abreast, and that it was "ten arms lengths high". According to Khalifa and Hussain the seawater channel allowed small ships to "approach as far as the gate to supply foodstuffs to the fort garrison after transferring it from bigger ships" (today the channel as far as it can be traced in the field terminates c. 400 meters from the presumed location of Qal'at Murayr – no trace of it beyond this has been located to date). Most references in Hakima (1965) and Khalifa and Hussain (1991) refer back to Lorimer who himself wrote as late as 1908. It is therefore unclear how reliable these descriptions are, given the more c. 100-year time lag between the end of Zubārah and the publication of his gazetteer.

During the late 1770s and early 1780s serious differences arose between the rulers of Zubārah and the Persian governor of Bahrain, Sheikh Nasr Bin Madhkur. The dispute raged over rights to the Gulf pearl banks, but also seafaring more generally and trade (Khalifa and Hussein 1993, 308; Rahman 2005). This led to a series of skirmishes and raids on dhows and settlements by both sides, culminating in a major raid on Manamah by the al-Khalifas late in 1782 A.D. This resulted in a retaliatory expedition against Al Zubārah lead by Sheikh Nasr Bin Madhkur in December 1782 A.D. Sheikh Bin Madkhur is said to have assembled a force of between 2,000-4,000 men to attack Zubārah and force it into submission. This force landed north of Zubārah between the town and Furayhah (Hakima 1965; al-Khalifa and Hussein 1993, 309; Warden 1856, 364-365). However, the landing was hampered by the boggy and marshy conditions of the *sabkha*, which allowed the defenders of Al Zubārah to mount an effective counter-attack during the landing. The attackers were also caught between the

Al Zubārah force and men assembled from Furayhah who attacked the rear of the Bahraini army. This two-fronted attack broke the Bahraini force quickly and they retreated to their boats.

Sheikh Bin Madkhur fled with the remnants of his force to Bushire leaving Bahrain virtually undefended. This prompted Sheikh Ahmad bin Mohammed al Khalifa to assemble an invasion force with the help of other members of the Utoob, who sailed to Bahrain from Kuwait. With this combined force he successfully invaded Bahrain in January 1783 A.H. and, given the lack of a defensive force, Bahrain was quickly overrun. The conquest of Bahrain by the Utoob led to a gradual move of the al-Khalifas and their followers from Zubārah to Bahrain over the next couple of years (Hakima 1965, Warden 1856). Zubārah thus seems to have been used mainly as a seasonal base by the al-Khalifas, dividing their time evenly between the two. However, Bahrain gradually increased in importance, since it was located more closely to the crucial pearl banks and probably provided better harbour facilities. Although this led to a few more years of stable trade and commerce in the region, and particularly for Zubārah, further violent confrontations soon ensued.

From the 1790s onward the al-Khalifa's struggled to maintain their hold over Bahrain and Al Zubārah and switched their allegiance between the rival powers in the region, at one time paying tribute to the Sultan of Oman, then the Khan of Iran, then the rising Wahhabi faction in central Arabia. Being a small regional, incipient city-state, the al-Khalifa's switched their alliances frequently to maintain a semi-independence from other states. However, this also frequently incurred violent confrontations from one side or the other. Consequently, between c. 1790 A.D. and 1809 A.D. Zubārah was confronted by numerous raids and attacks, which seem largely to have been repelled by the defenders.

As part of these regional instabilities and changing alliances, Wahhabi forces occupied Al Zubārah in 1809, although they had previously been allied to the Khalifas. The Wahhabis at the time were allied with the Qassimi pirates who also had their base close to Zubārah. These were in constant violent conflict with Oman, raiding ships in the Gulf. There had been a long-standing conflict between the Wahhabi faction and the Sultanat of Oman. The constant threat of piracy and the allegiance between the Wahhabis and the Qassimi pirates prompted the Sultan of Oman to launch attacks on their bases throughout the Gulf starting in 1809 (Rahman 2005), supported by British naval vessels and Indian troops. This marked the first serious intervention of the British in the Gulf region, since piracy also threatened British interests in the region. As part of these raids Omani forces successfully attacked Al Zubārah in 1811 and burnt it to the ground (Rahman 2005, 20). This seems to have brought the major phase of settlement at Zubārah to an end. British operations against pirates in the Gulf continued until 1820 when a comprehensive peace agreement was signed, which made Britain the de facto protector of several Gulf principalities. Warden reports that British Naval Forces attacked Zubārah in response to pirate attacks in the region some time in 1819, which suggests that the town was still used as a base (Warden 1856).

A brief description of Zubārah can be found in the records of Captain George Barnes Brucks, who carried out the first comprehensive cartographic survey of the Arabian Gulf in 1822-1824. His brief description of Zubārah is as follows:

“Zobara is at latitude 26° N., long 51° 8' 30'' E. It is a large town, now in ruins. It is situated in a bay, and has been, before it was destroyed, a place of considerable trade. The inhabitants are of the Tribe of Alassar, and subject to Bahrein; a number of fine Nujdee horses are still exported from this place. This was originally the



**Figure 2.2:** The first known map showing Zubārah and other settlements (including Furayyah) in northern Qatar. It was created by Captain James Brucks as part of a British Navy survey of the Gulf in 1822-1824. Zuārah is indicated as a small settlement with italics underneath that say *extensive ruins*. By this time then Zubārah was likely much diminished in size and largely abandoned, suggesting how destructive the 1811 attack was (© The British Library)

principal place of the Uttoobee Tribe, until they separated.” (p. 562).

This shows that while the town continued to be settled, it was much diminished in size and in poor repair. Along with this description the British East India Company Marine Service published a map of the Persian Gulf in 1832, which seems to show Al Zubārah for the first time, and also indicates it as a ruin (Figure 2.2). From this it seems that the major phase of settlement at Zubārah lasted for only 45 years or so. It is difficult to find further reference to Zubārah during the mid to late 19<sup>th</sup> century. Following the attack of 1811 the town appears to have continued as a much smaller settlement, becoming eclipsed by other towns in the region (principally Manama and later on Doha). This appears to be a result not just of the 1811 attack, but also the relocation of the al-Khalifas to Bahrain starting in the late 18<sup>th</sup> century.

The next notable point in Al Zubārah’s history occurred in 1895, as part of which Zubārah played a significant role in the relations between two world superpowers at the time: the Ottoman Empire on



the one hand and the British Empire on the other. The Ottomans had begun to exert considerable control over Qatar's affairs during the mid to late 19<sup>th</sup> century. In 1895 Sultan bin Mohammed with the support of Sheikh Jasim bin Mohammed bin Thani – the de facto ruler of Qatar at the time – attempted to re-establish a serious settlement at Zubārah, having fled Bahrain as part of dynastic struggles there. Although Al Zubārah appears to have continued as a small settlement after the 1811 destruction of the Utoob town, and was resettled by refugee families exiled from Bahrain during the 1820s and 1830s (Rahman 2005, 40-41), by the 1890s it was likely not more than a small fishing village. The settlement of dissidents from Bahrain at Zubārah was perceived as a threat by the ruler of Bahrain, Sheikh Isa, so that he called on his British supporters to intervene (Rahman 2005, 125-144), which was to result in the Zubārah crisis. A British naval vessel – *HMS Sphinx* – commanded by Captain J.H. Pelly and accompanied by the Assistant Political Resident Gaskin, arrived at Zubārah on July 7<sup>th</sup> 1895 to try and find a solution to the looming crisis. By this point a force of 1,500 men and several dhows had arrived in Zubārah. An ultimatum delivered by the British on behalf of Bahrain was ignored, which prompted Captain Pelly to seize eight dhows in the harbour of Al Zubārah. Tensions in the region increased in the following weeks with an Ottoman gunboat – the *Zuhaf* – arriving in the region and the British dispatching *HMS Lawrence* to aid *HMS Sphinx* in protecting Bahrain, while more men were assembled at Zubārah. The crisis reached its zenith on September 7<sup>th</sup> 1895. By this point 200 dhows were assembled in the harbour of Zubārah leading Sheikh Isa to believe that they were poised to launch an attack on Bahrain. Following the passing of a further ultimatum put to Sultan bin Mohammed by Captain Pelly he proceeded to attack the dhows in the harbour. *HMS Sphinx's* and *HMS Pigeon's* cannons destroyed forty-four ships before a flag of truce was raised. Following this engagement the remainder of the dhows were seized and sent to Bahrain together with the dissident Bin Ali who had been reconciled with Sheikh Isa.

Following the Zubārah crisis the settlement remained largely abandoned and continued as a small settlement at least into the 1930s or so. In 1936 further disagreements between Qatar and Bahrain over the allegiance of the al-Nai'īmī tribe who had now settled in the Zubārah area and continued to occupy what was left of Qalcat Murayr, further confrontation between the two emerging countries resurfaced. In the 1930s the Nai'īmī tribe refused to declare its support for the al-Thani. Instead, the al-Nai'īmī's stayed allied to the al-Khalifa's in Bahrain even though they had abandoned control over Al Zubārah during the 1870s and 1880s, partially due to British pressure. Bahrain dispatched a few tax officers to Al Zubārah to claim sovereignty over the al-Nai'īmī, which prompted the rulers of Qatar to dispatch a large armed force to the area. The al-Nai'īmī's in response also armed themselves and barricaded in Qal'at Murayr. After a stand-off between the two forces, and active intervention by the British, the al-Nai'īmī declared allegiance to the al-Thani and the Bahraini tax officers departed. This resulted in the construction of Qal'at Zubārah, which still stands at the site today. The garrison at this fort re-asserted the al-Thani control over Zubārah, but small-scale confrontations continued until the mid 19<sup>th</sup> century. By 1950, when Geoffrey Bibby visited the site, Al Zubārah was completely abandoned (Bibby 1950).

### **2.2.2 Zubarah and the Pearling Industry**

One of the primary reasons for the arrival of the al-Khalifa's in Zubārah was their interest in the pearl banks around Bahrain and northern Qatar. It is therefore important to contextualize the settlement

and rapid rise of the town in the later 18<sup>th</sup> century against the background of pearl fishing and trade. The development and rise of Zubārah have to be understood primarily against the background of what was an absolutely critical economic force in the region in the 18<sup>th</sup> and 19<sup>th</sup> century (Carter 2005). Although Zubārah's main phase of occupation pre-dates the development of the major pearl trade of the late 19<sup>th</sup> century, it was nevertheless pearls that led the al-Khalifas to seek out Al Zubārah and exploit its geographical position.

A wide range of data indicate the crucial economic importance of the Arabian Gulf pearl trade. In a useful review Carter (2005) shows not only that this was a very long-lasting economy in the Gulf, which has its origins in prehistory, but also how critically important the harvesting and trading of pearls was both to support large merchant towns, and in shaping the social and cultural history of the Gulf at the time. Quoting Lorimer (1908), Carter argues that by the early 20<sup>th</sup> century about a quarter of the male population of the Gulf was involved in one way or another in the pearl trade. Pearl trading had increased in economic importance since the Middle Ages, as the appetite for pearls in Persia, East Asia and Europe grew steadily. Pearls from the Arabian Gulf were widely regarded as some of the most perfect, and were thus highly sought after. Trade links with India via the Strait of Hormuz and the Indian Ocean were particularly important, and many pearls went to Bombay for redistribution elsewhere. Bahrain had always been known as a key pearl fishing location since at least the late 17<sup>th</sup> century. Interestingly written sources indicate that the pearl trade was reorganized during the late 18<sup>th</sup> century, which coincides with the founding of Zubārah. This reorganization shaped the industry until its collapse in the mid 20<sup>th</sup> century. The reorganization revolved around the dissolution of the Safavid state in the mid-18<sup>th</sup> century and the founding of pearl fishing and trading towns elsewhere in the Gulf, which were to become the founding settlements of the modern Gulf cities. While Bahrain continued to play an important role after the al-Khalifas had affirmed their control over the island in the 1780s, pearling was now the economic basis of many towns in the Gulf. The major phase of settlement in Zubārah falls into this time frame when political and economic conditions in the Gulf were undergoing significant changes. The arrival of the al-Khalifas in Zubārah could thus be seen as part of the move toward a wider taking up of pearl fishing by communities around the Gulf littoral.

One of the key economic stimuli for Zubārah's rapid rise was that duties and taxes on trade were either very low or not imposed at all. Since the al-Khalifa's were themselves involved in the pearl trade this makes sense, but it also means that the incipient city state was funded entirely from rulers personal revenue generated through their participation – and likely control of – the pearl fisheries and trade. It is therefore likely that control over the pearl trade, either direct or indirect, was a key instrument of control. The entire pearling industry operated on a debt basis, with ships having to be built, equipped and run on credit provided by wealthy merchants until they had generated more income from selling the fished pearls. Pearl divers were indebted to the boat captains (*nakhoda*), who themselves owed money for building and equipping the ships to merchants and financiers. This resulted in a multi-layered system of economic and debt dependency (Carter 2005), which worked well with the strong pre-existing tribal and family affiliations.

The work and lives of the pearl divers were tough. During the two relatively short diving seasons that lasted from late spring into early summer, and late summer into early autumn, they would dive all day with only short breaks, descending to depths of up to 15m to gather pearls (Bowen 1951). This put a heavy strain on their bodies and caused early death in many. The bends, shark attacks and other injuries were common threats for pearl divers, and their individual exploits were often not rewarded

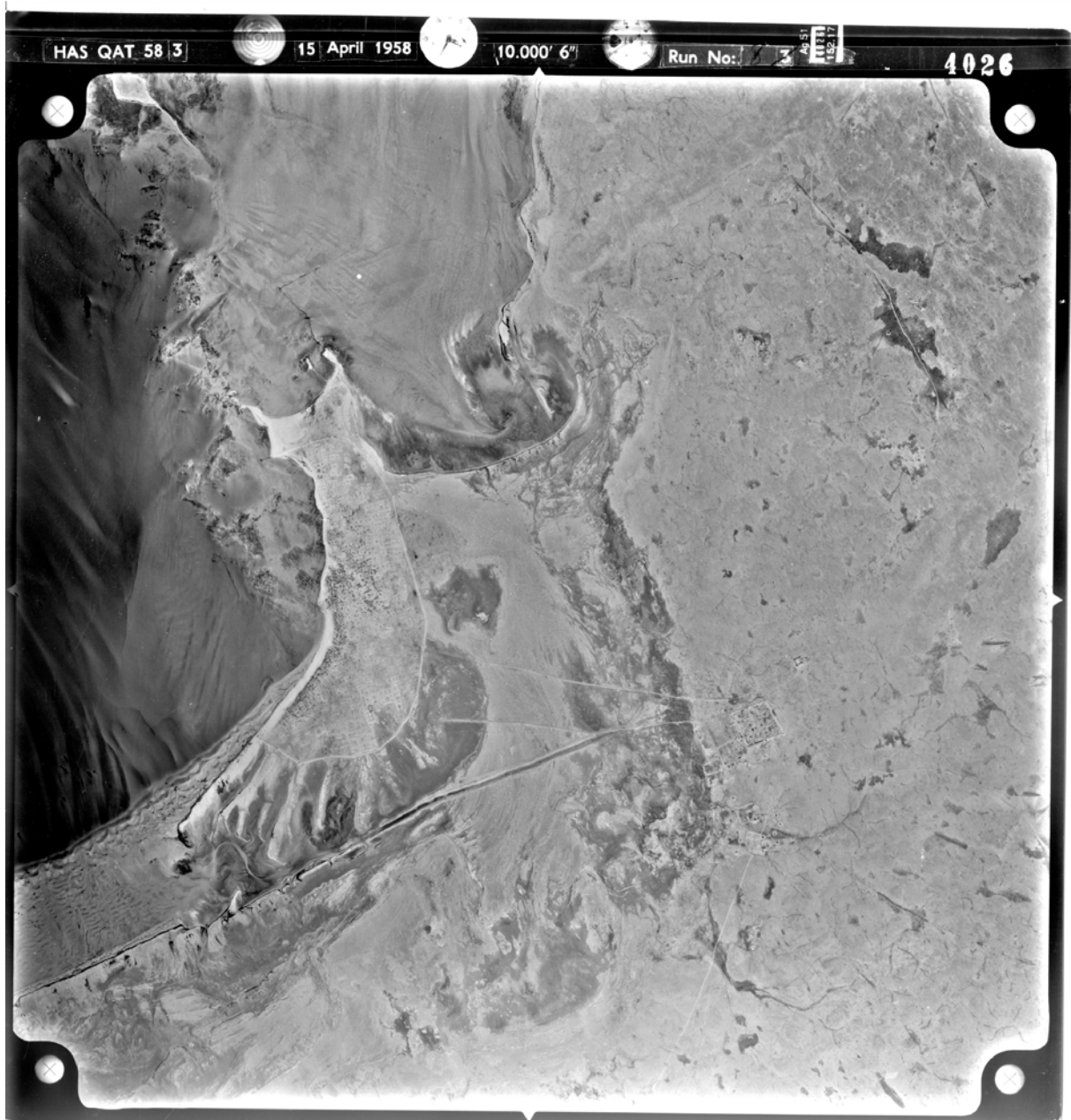
with substantial returns. Since this was a seasonal occupation, divers likely pursued other exploits during the off-season, and may have migrated to other parts of the Gulf in pursuit of other seasonal labour. This may have fitted in well with already existing migratory patterns of Bedouin communities in the region, since the pearl fishing seasons fell into the periods just before and after the very driest months of the year. It is conceivable that many pearl fishers took up animal husbandry while not working on the boats, or may have joined other dhows as they conducted fishing and trade around the Gulf.

In relation to the pearl trade Al Zubārah is a rare urban manifestation of a merchants' settlement in the Arabian Gulf and unlike many other urban centres in the region. Its economy was heavily dependent on the pearl trade, although perhaps not as unilaterally import-dependent as has sometimes been argued. The latter is based on the idea that the local environment was too dry and harsh to support large scale, specialized urban populations. Accurate numbers for the export of pearls and the import of other goods are difficult to obtain, and the relationship between pearl trading towns and their hinterland has to date never been fully investigated. In the case of Zubārah, Warden (1856) suggested that there were ten to twenty 'forts' in the vicinity of Zubārah. These structures, which are perhaps better understood as fortified compounds, were one integral part of small agricultural settlements in Zubārah's vicinity. If they are contemporary, it may show a much higher contribution of local agricultural produce from these settlements to Zubārah than commonly assumed. It is also important to bear in mind that the pearling fleets were at sea for several weeks during the main harvest seasons. They had to be supplied and re-supplied with food and water to allow them to stay at sea for long periods of time. The same is true of merchant vessels, which traded pearls to ports further afield. It therefore seems important to consider the hinterland and its economic importance in greater detail. Another reason to think that the hinterland must have played a greater economic role is that, in the case of Al Zubārah at least, fresh water was only available beyond the *sabkha* along the escarpment (see Macumber 2009 and Section 6 of this report).

The income derived from the pearl trade for the ruling families of Al Zubārah and other towns like it, established the economic basis of these incipient city states, which characterize the political landscape of the Gulf even today. The pearl trade was, therefore, a major economic force that shaped the social and political realities in the region since at least the 18<sup>th</sup> century. Many of the ruling families were directly involved in the pearl trade and fostered its growth by not imposing taxes or custom duties. Instead, they derived their wealth from being involved in the trade themselves. Official state institutions were thus slow to emerge in these merchant city-states, but they were nevertheless the incipient social and political structures on which the emergence of the modern Gulf States was built.

### **2.2.3 Zubarah's Hinterland**

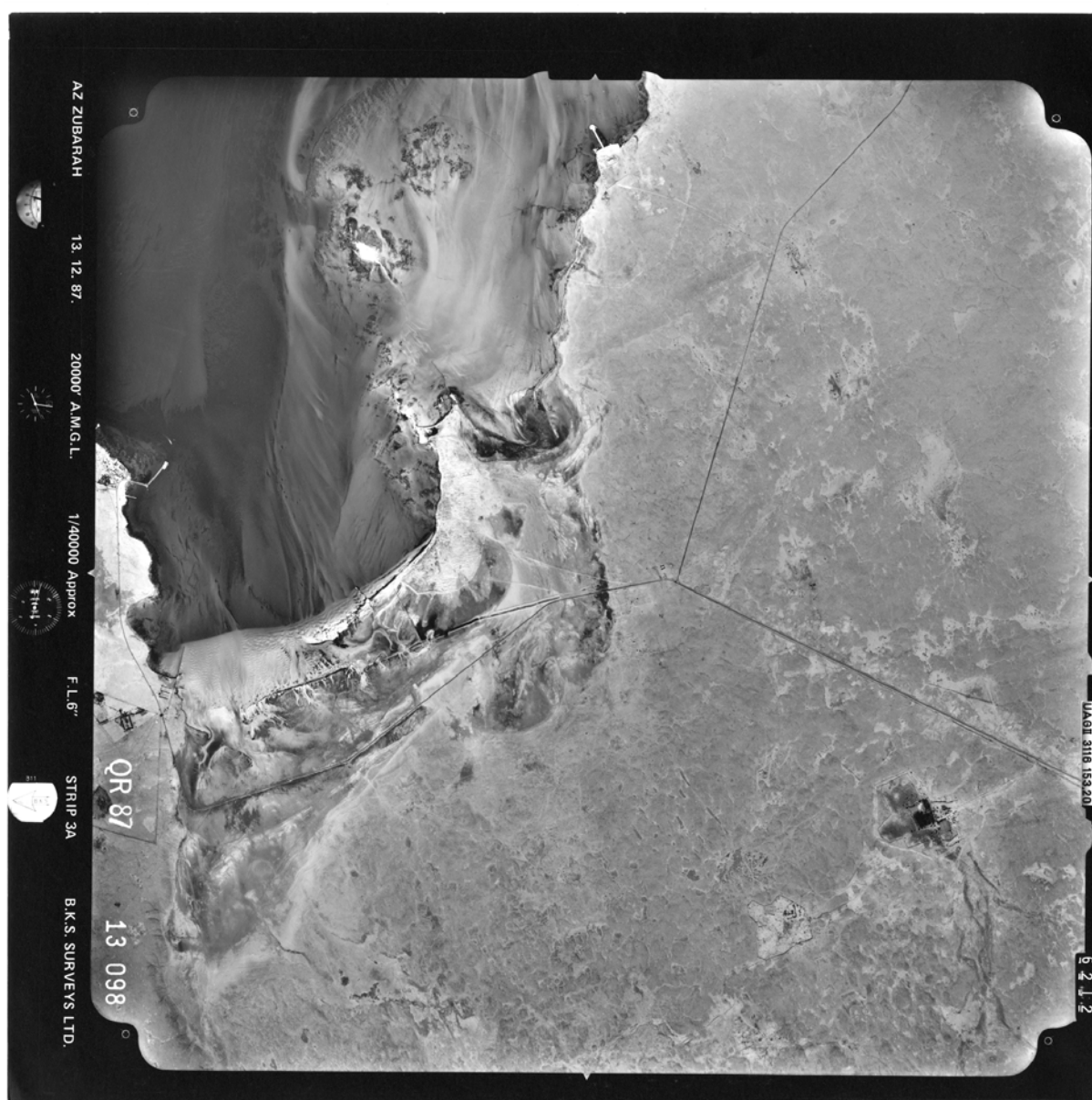
As noted above, Zubārah's hinterland may have played an important role in the development of the settlement, and may have been drawn in to the economy of the pearl trade to a much greater extent than often assumed. It is for this reason that the QIAH Project explicitly aims to consider the Al Zubārah hinterland in its archaeological field investigations (see section 1 and 3.5). As previously stated, Warden (1856) described the presence of ten to twenty fortified compounds at and around Zubārah, and we have already discussed the construction of Qal'at Murayr which, although technically connected to Zubārah by the two screening walls, can also be considered part of the site's hinter-



**Figure 2.3:** Aerial photograph from 1958 showing Al Zubārah and Qal'at Murayr (Courtesy of the Qatar Museum Authority).

land. Other settlements in the region also played an important role. The site of Furayhah, for example, also subject of our investigations during this field season (see Sections 3.4 and 8) is mentioned in accounts of the battle of Zubārah and in Captain Brucks report on navigation in the Gulf, and is shown on the 1824 map of the region (see Figure 2.2). Other settlements in the area include Qalcat al Thaqab, Helwan, Ruways, and Rubaigah. Many of these sites consist of fortified compounds, accompanied by small settlements or villages, as well as agricultural installations.

Previous work as part of QIAH (Macumber 2009), has shown the critical importance of the local water resources to the 18<sup>th</sup>-20<sup>th</sup> century communities in the area (see also Section 5 of this report).



**Figure 2.4:** Al Zubārah in 1987. This aerial photograph shows the change of the local landscape since the 1958 photographs was taken, including the constriction of the pier at Zubārah and the local road network (Courtesy of the Qatar Museum Authority).

Wells, which are dotted along the 20m contour line, were excavated to tap into fresh ground water all along the escarpment overlooking Zubārah. At the same time, Zubārah had no fresh water source within the town walls, heightening the need to claim, protect and exploit this critical resource nearby. Qalʿat Murayr is associated with a series of wells, which likely supplied fresh water to Zubārah's occupants. Other settlements in the surrounding area are also situated around these fresh water sources. For fresh water alone Zubārah was therefore heavily dependent on its hinterland, and given the critical importance of this resource, it is not surprising that during the turbulent times of Zubārah's existence these wells were often situated amidst fortified structures. These wells were not



**Figure 2.5:** Map showing principal architectural features at Zubarah and Qal'at Murayr, based on the 2009-2010 surveys by QIAH.

only required to supply the town itself with fresh water, but also supported the key economic base of the town: the pearling fleet. Dhows that were engaged in pearl fishing were at sea for several weeks and had to stock sufficient water for longer trips before heading out to the pearl banks. Access to water was therefore crucial to maintain Zubārah's pearling economy. It is likely that water was not the only resources drawn from the hinterland. Foodstuffs may have also been drawn from the hinterland, both to supply the inhabitants of the town as well as the pearling dhows. What role exactly the hinterland may have played in these economic relations is a question that has yet to be investigated in detail (see Section 3.5).

As sparse as the written and other sources are on Zubārah, they are even more sparse on the smaller settlements in the region. Few accounts mention Furayhah or any of the other settlements in north-west Qatar in any great detail, particularly during the 18<sup>th</sup> or early 19<sup>th</sup> century. Archaeology therefore offers one of the key means to gain further information on these sites. Many may have been in existence before Zubārah's expansion during the late 18<sup>th</sup> century, but it could well be that the Utoob's arrival in Qatar may have marked a critical change in the way in which the local landscape was exploited. How significant this impact was, or if it indeed occurred, can be investigated archaeologically.

## **2.3 Results of Previous Excavations**

### **2.3.1 Qatar Museums Authority Excavations 1980**

The Qatar Museums Authority (QMA) carried out two excavation projects in Zubārah, the first during the early 1980s, and the latter in 2002-2003. The 1980s excavations were the most comprehensive of the two and targeted a c. 3,000 m<sup>2</sup> area in the northern part of the site, which revealed a large compound sub-divided into smaller rooms arranged around courtyards. A further 1,300 m<sup>2</sup> area was excavated in the centre of the town toward the beach front and was interpreted as a *souk* by the excavators. During that season a c. 600m<sup>2</sup> area in the southern part of the town was also excavated, which targeted the southwestern corner of a large, fortified compound. In addition, the excavations exposed sections of the outer town wall, as well as one of the large middens outside the town wall. Excavations as part of this season of the QIAH project did not impact on any of these previous excavation areas.

### **2.3.2 Qatar Museums Authority Excavations 2002-2003**

A further excavation was carried out by QMA in 2002-2003 in the northwestern sector of the town. These excavations covered an area of c. 3,000 m<sup>2</sup> and revealed a series of domestic buildings, lanes, and courtyards. The area is situated close to the beach and is outside the inner town wall. Excavations as part of QIAH Stage 2 did not impact on these previous excavations. However, due to the fragility of the architectural remains in this area, some emergency conservation measures were carried out here (see Section 10).

### **2.3.3 Aerial Photographs**

A series of aerial photographs, two of which are reproduced here (Figure 2.3 & 2.4), detail the later development of Zubārah and the surrounding landscape. The first photograph (Figure 2.3) was taken in 1958 and shows Zubārah in an almost unaltered state. The layout of the town, streets and individual courtyard houses are clearly discernable. The second image (Figure 2.4) clearly shows the modern development that occurred since 1958, including the construction of the Ras-Ushayriq road, as well as the pier to the south of the Zubārah. These images will in the future help to draw an ever more complete and accurate town plan of Zubārah, detailing the urban layout.

## **2.4. Summary and Conclusions**

Historical sources provide a wealth of information on the development and history of Zubārah from the mid 18<sup>th</sup> to the early 20<sup>th</sup> century. They detail the at times turbulent history of the settlement, how its development fits in with wider geopolitical and historical parameters, and how it gradually came to be abandoned during the 19<sup>th</sup> and 20<sup>th</sup> centuries. However, in a number of key areas the historical records are insufficient to provide a more detailed picture of the town. There is no detailed description of the settlement during its main phase of occupation in the mid to late 18<sup>th</sup> century and the written sources are murky where the origins of the town are concerned. Was there a pre-Utoob settlement at Zubārah or not? They are also primarily concerned with the activities of the rulers and major political actors, whereas the lives of ordinary tribesmen, fishers and merchants remain hidden from history. These are important historical elements which archaeology can help to elucidate, while referring back to the historical sources that provide the overall outline of Zubārah's historical development. What is clear already is that the town of Zubārah was a very particular urban form and development in the history of the Arabian Gulf and represents a phenomenon that deserves much more further study. Urban archaeology is uniquely equipped to address these issues, and we will refer back to the details of the historical background throughout this report.



### 3. Research Questions and Objectives

*Tobias Richter, Richard Humphrey, Michael House, Tom Collie, Philip Macumber, Gareth Rees, David Mackie and Alan Walmsley*

#### 3.1 Introduction

In this section we outline the general and specific research questions we aimed to address as part of this season, both with respect to the project as a whole, as well as with respect to each of the project's components (Figure 4.1). As has become clear from Section 2 of this report, the site promises to fill important gaps in our understanding of the later Islamic periods in northeastern Arabia and the Arabian Gulf. To better understand these and to situate them within the broader, international archaeological context is the prime research aim of our program of fieldwork.

More specifically we seek to address the following research questions in the project as a whole:

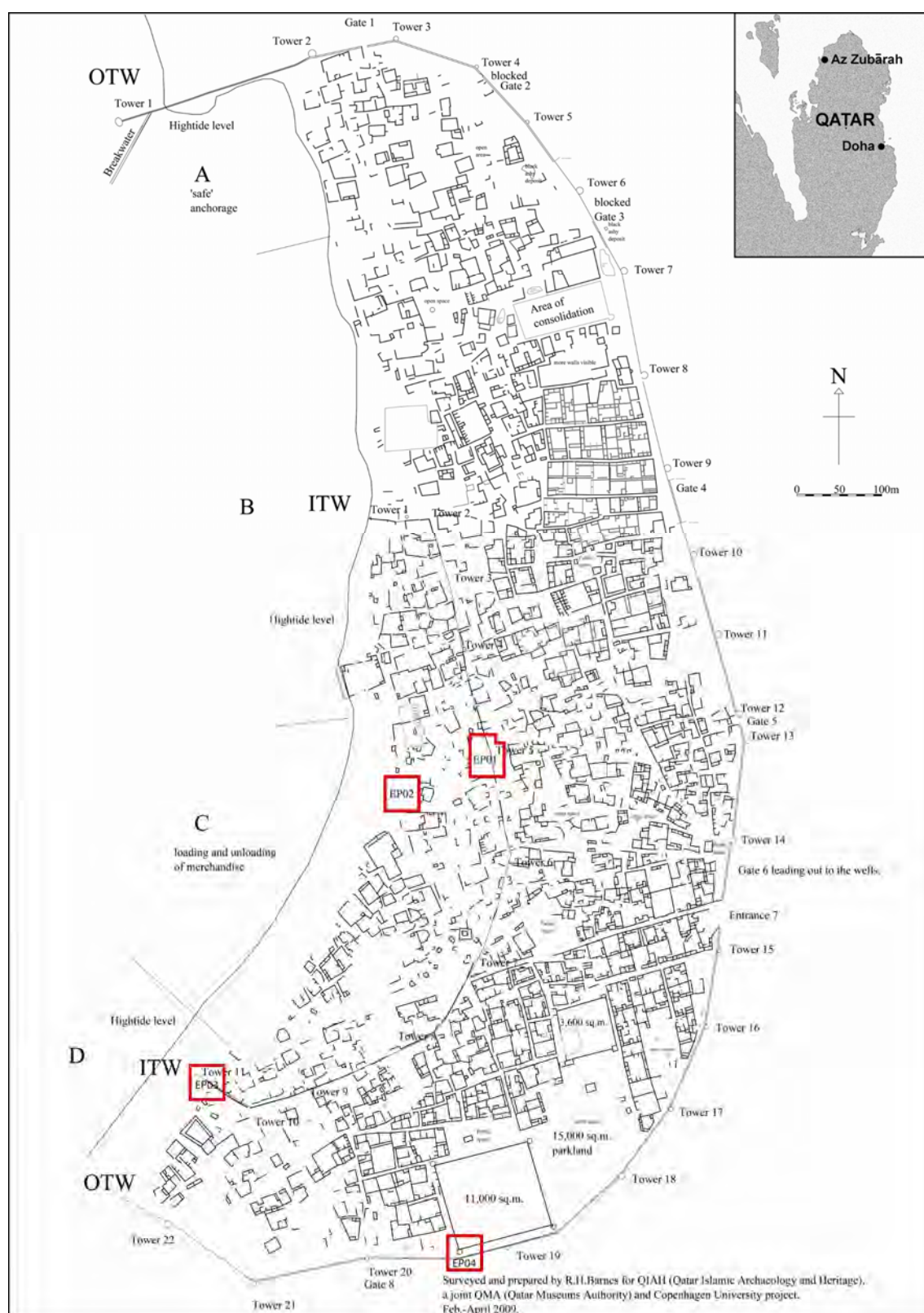
1. *What was the nature of settlement at Al Zubārah prior to the arrival of the 'Utoob during the 1760s?*
2. *Did Zubārah primarily have an import-based economy driven by the fishing of and trade in pearls, or was there also an economic input from the surrounding hinterland?*
3. *To what extent does the archaeology confirm or contradict written sources on Zubārah and north Qatar?*
4. *What was the nature of Zubārah urban topography?*
5. *What trade links can be reconstructed from the material culture from the sites?*
6. *What can be learnt about the constitution of people's identities through material culture, food consumption and architecture?*

#### 3.2 Excavations in Al Zubārah

##### 3.2.1 ZUEP01

The area excavated last season as ZUEP01 mainly focused on understanding the phasing of the central tower feature, and the many rooms and walls running off this structure. These previous excavations generated a number of important questions that required further investigation. ZUEP01 is situated in the centre of the town, roughly midway between the beach and the outer town wall, and incorporates a segment of the inner town wall with one tower, as well as a number of seemingly residential compounds or domestic units.

The research questions addressed in ZUEP01 were:



**Figure 4.1:** Composite plan of Zubārah showing the four areas of excavation investigated during the 2009-2010 season of excavation. ZUEP01 and ZUEP02 were continued from QIAH Stage 1, Season 1, while ZUEP03 and ZUEP04 are new excavation areas.

1. *What is the stratigraphic relationship between the tower and inner wall on the one hand, and the domestic buildings to the northwest and southwest on the other?*
2. *Were the compounds out of use by the time the inner wall is constructed using their pre-existing wall lines or do they incorporate elements of the previous buildings which continue to be used?*
3. *What was the function of the inner town wall and tower?*
4. *What are the absolute dates for the various phases of construction and occupation of the tower and associated compounds?*
5. *What activities were carried out in the suspected domestic buildings?*
6. *Are there any differences between the area inside the inner wall and the area outside during the later phase of occupation?*
7. *What was the length of occupation in this part of the town and what is the earliest phase of occupation?*
8. *Were occupational changes due to abandonment, renovation or destruction?*

These questions were addressed by continuing the excavation of the NW compound, areas to the south, southeast and east of this compound, as well as the tower and inner wall. In some parts this required the partial and strategic removal of later structures following detailed, full-scale recording.

### **3.2.2 ZUEP02**

The excavation area ZUEP02 is a 40 x 40m square located within the second wall overlooking the beach. The area was excavated early in 2009 and consists of four distinct areas: a central compound, a street NE & NW of the compound, an eastern structure (linked to the main compound), and the southern extension to the compound. The earlier 2009 season identified three architectural phases within these subdivisions. This season had several distinct aims to try and gain a better understanding of the area and its function (either static or changing) throughout the development of Zubārah:

1. *Could the identified three phases of architectural and occupational development be further sub-divided or fine-tuned? The architecture on the ground would suggest somewhat greater complexity and in addition the area may have at one point been used as an open space with no standing structures.*
2. *What is the nature of the occupation beneath the current late and middle phase of occupation?*
3. *How was public traffic directed through this area and what was the nature of the neighbourhood structure in this area?*
4. *Could the complete shape of space 1 – a long rectangular structure – toward the east be established?*

5. *What was the function and use of the buildings in this area during the different phases of occupation, and is there a discernable change through time?*
6. *What is the earliest phase of occupation in this area of the town?*

One of the main aims this season was to fine tune this phasing, possibly introducing sub phases, as there appeared to be more complexity to the architecture and there may have been a period or phase when some of the area operated as an open space with no standing structures. Another aim was to stratigraphically link the discrete excavation areas from the 2009 season. At the start of work a great deal of information was confined below late phase structures that were been excavated both internally and externally, but for which the walls remained standing.

### 3.2.3 ZUEP03

This is a relatively small area encompassing extant remains of a tower, road and segment of the inner wall. ZUEP03 is situated at the southern terminus of the inner wall, where it meets the modern beach. Excavation here was intended to detail structures that related to possible harbour/ bay defences and also travel routes directly along the coast. These investigations addressed the following research questions:

1. *Was the use of the road leading from the southern pier into the town contemporary with one of the main phases of occupation of Zubārah, and if so, which phase did it relate to? For example, does the road cut across the inner wall or was there a gateway at this point? This would consequently provide a relative date for the pier.*
2. *What was the nature of the Inner Town Wall Tower 11 (ITW-T11) and the inner wall in this area? Was its use similar to that in ZUEP01?*
3. *Did the east running, inner town wall terminate at the tower or did it continue further toward the bay?*
4. *Was the road running east along the inner wall contemporary with the wall, earlier, or later? Can it be traced archaeologically and what is its structure?*
5. *What was the method of construction of the road leading into the inner town and what is its course?*
6. *What were the earliest and latest phases of occupation in this area, and what chronological evidence was there for the development of the town layout?*

To address these questions a 35 x 15m area incorporating the tower, the wall and the road will be prepared for archaeological investigation. Fifteen meters to the north, another 5 x 35 m window will be used to discover the road possibly running north-east.

### 3.2.4 ZUEP04

This area of excavation was situated in the southeastern sector of Zubārah town, targeting what appeared to be the largest extant compound at the site, as well as the outer town wall. This area displayed a complex number of large rooms, enclosed by a massive perimeter wall with associated corner towers, which interestingly correspond to areas in the outer settlement wall that were without towers. The area is intriguing for numerous reasons. The tower placements within this building as well as the structure's close proximity to the outer wall indicate some form of defensive structure. The size of this compound suggests that it was an important building, and its alignment with the surrounding planned neighbourhoods suggests that it is contemporary with their construction and presumably use. The specific questions addressed by working here were:

1. *What was the function and use of this very large building? Was it a public building, purely a defensive structure, the seat of an important (ruling?) family, or did it fulfil a mixture of all these function?*
2. *What similarities and differences can be seen in architecture, layout, material culture and use of this building versus contemporary buildings within the central part of town (e.g. ZUEP01 & ZUEP02)?*
3. *What clues can the material culture recovered from this structure provide about the identity of its inhabitants, their status and role within the social fabric of the town of Zubārah?*
4. *Do the towers provide support for Tower 19 on the outer wall? If so, why directly from the south? Was the approach from the south to Zubārah particularly easy when compared to the north or east? Was this building linked in purpose to the ditch to the south-east? Were the salt flats around the southern regions of the fort shallower thereby facilitating access to the settlement? Is this actually a fort or could it be merely a barracks holding soldiers?*
5. *What is the date of the construction, use and abandonment of this building? Was it a single- or multi-phase building?*
6. *How did this structure relate to the organized neighbourhoods surrounding it and to the open spaces to the north and northeast?*

This archaeological area is important since it provides a fresh view of Zubārah in its potentially earlier stages of development (i.e. before the settlement apparently diminished behind the inner walls). It would possibly characterise the defences of the early town and enable an insight into the more elite echelons of Zubārah town. It may begin to explain the actual decline of the settlement, especially if there are signs of deliberate destruction and damage.

### 3.3 Survey and Evaluation at Qal'at Murayr

Qal'at Murayr is a fortified structure and settlement situated approximately 1.65 km west of Al Zubārah town. The site is closely related to Al Zubārah, since two screening walls run from the outer town wall of Zubārah toward the escarpment on which Qal'at Murayr is situated. These walls, and likely Qal'at Murayr itself, served to protect access to a number of wells here, which supplied the town with fresh water.

The site is also associated with a field system, enclosures, and out-buildings, suggesting a larger settlement surrounding the fortified structure. Today, the remains survive as partially buried walls, suspected marks in the topsoil that may represent buried or robbed out walls, earthworks, as well as some standing masonry.

Apart from occasional references in the literature and a number of photographs little is known about Murayr's history. Archaeological investigations therefore promise to reveal crucial information about the origins and use of the site. The specific research questions addressed were:

1. *What was the overall extent of the site?*
2. *How did the different structures at the site relate to each other?*
3. *How was Murayr chronologically, economically, politically and socially related to the town of Zubārah?*
4. *Is there any evidence for different phases of occupation or sequential development?*
5. *What was the date of construction and use of the site, and what was the chronological development of different phases?*

To address these questions a dual survey/mapping and excavation strategy was adopted. An initial 'walkover survey' set out to evaluate the extent of the site. In areas where walls and other architectural features were visible, removal of the thin, recent overburden revealed the complete layout of buildings and clarified the phasing of different structures. These remains were then mapped using primarily a TST1203 series (EDM) taking centre points on all features to create a line map of the Murayr landscape. This line map was complimented by several excavated interventions to produce detailed drawn plans as well as providing dating evidence to give context and resolution to the more general survey.

### 3.4 Survey and Evaluation at Qal'at Furayhah

Qal'at Furayhah (Freha) is a fort with associated settlement and intertidal fishtrap system located c. 3.5 km north of Al Zubārah town. The fort was previously excavated by the QMA, but the settlement has to date not been thoroughly investigated. Previous excavations at the site suggest that the site is broadly contemporary with Zubārah, but may incorporate earlier phases. Furayhah therefore offers an

opportunity to reconstruct both the relationship between Zubārah and other, smaller settlements across the landscape, as well as to provide clues about the development of the regional settlement pattern.

The key research questions addressed at Furayhah were:

1. *What is the extent of the settlement?*
2. *What are the origins of the site?*
3. *How did the site develop over time?*
4. *What are the functions of the various out-buildings surrounding the fort and what can they indicate about the economic activities at the site?*
5. *What does the layout of the settlement reveal about social and political organization?*
6. *What are the political, social and economic links between this site and Zubārah?*

To investigate these questions a dual investigative strategy was adopted, incorporating both survey and limited excavation. A walkover and photographic survey was followed by a detailed total station survey to create a plan of the entire extant surviving remains. Based on the initial walkover survey and the results of the topographic work, excavations were carried out in a small number of areas to characterize the preservation of buried archaeology and to provide insights into some of the research questions posed above.

### 3.5 Regional Survey

As discussed previously, the hinterland of Al Zubārah is of critical importance to understand the origins and development of the town, and to detail the social, political and economic connections between the inhabitants of the town and communities elsewhere. In addition, this survey acts as a means to record the historic environment of northwestern Qatar throughout its human occupation to allow for the protection and preservation of the historic landscape by the QMA. The research objectives and aims thus include the recording of sites of all types and time periods to create an as complete as possible record of human occupation.

More specifically with reference to Zubārah, the long-term aim is to characterize the town's hinterland to reconstruct the social, economic and political relations between the town's inhabitants and those of the surrounding region.

The research questions established in this were:

1. *What evidence is there within the survey area for pre- and protohistoric settlement (ranging from the Lower Palaeolithic to the Iron Age)?*

2. *What evidence is there for classical, pre-Islamic settlement?*
3. *What evidence is there for early Islamic, Medieval, and post-Medieval settlement in the region?*
4. *What types of sites occur within each of these chronological phases?*
5. *What is the distribution of these sites across the landscape, and are there any discernable patterns?*
6. *How do different types of sites in different time periods relate to the distribution of natural resources, e.g. water?*
7. *What are the threats to site preservation across the survey area and what is the condition of the encountered sites?*

### 3.6 Geomorphological Survey

The geomorphological survey carried out by Dr Phil Macumber continued the work he carried out during Stage 1. More detail on how the Stage 2, Season 1 fieldwork fits in with this previous work is provided in section 6 of this report. Here, the principal research questions of the geomorphological survey are stated for consistency, and more detail can be found in the geomorphology section of this report. The aims of the geomorphologic survey were:

1. *Finalize the dating of the sequences deposited by the mid-Holocene transgression and regression in the vicinity of Al Zubarah*
2. *Examine northern Qatar with a view to determining which aspects of the landscape were significant in determining the potential for past occupation, with emphasis on the nature of the 130-110,000 yr old marine transgression in the Al Zubarah-Al Jumayl area, and nature of the groundwater systems. Relate this to early occupation.*
3. *At the behest of the Department of Antiquities examine the archaeological potential in the vicinity of Al Khor on the eastern coast at the Aerospace City site, north of Doha*

### 3.7 Research Questions and Objectives: Conclusion

The research questions outlined in this section guided our approach to the excavations and surveys in and around Zubārah. While they provided starting points for our investigations they were not considered as a static framework, but as a dynamic guideline which allowed excavators to alter or pose new questions as results from excavations arose. We will return to address the research questions outlined in this section in the report's summary (see section 10). In preparing the methodology of our excavations and surveys the above research questions were taken into close consideration and guided the implementation and execution of the research methodology, which we will outline in the following Section 4.



## 4. Methodology

*Tobias Richter, Michael House, Gareth Rees, David Mackie, Richard Humphrey & Tom Collie*

### 4.1. Introduction

This section summarizes the excavation and survey methodologies employed by QIAH. They were tailored to address the research questions outlined in Section 3, providing a rigorous set of procedures to guide the excavations at Zubārah and associated sites in the surrounding landscape. In the following we will briefly outline the various components of the excavation and survey methodology.

### 4.2. Open Area Excavation

In contrast to many conventional excavations carried out in the Middle East, this project did not rely on the so-called box-grid Wheeler-Kenyon method of excavation. Although this system, for which a site is excavated in grid-squares of equal size leaving standing baulks between excavated areas, provides great stratigraphic control due, it prohibits the exposure of buildings in full plan and causes excavations to be carried out ‘out of sequence’ with later sediment remaining standing as part of the baulks. This potentially causes contamination of deposits with later finds and also creates artificial boundaries of excavation. In the case of Zubārah this system would also be difficult to implement, as a lot of the sediment at the site consists of loose silt and sands, which are liable to collapse easily

Open-area excavations operate without the use of baulks, enabling a more dynamic approach to targeted excavation, as well as the excavation of complete features in the correct stratigraphic order. This system is commonly used in settlement archaeology elsewhere, particularly in Europe, to reveal complete plans of buildings and structures, and to relate the various phases of construction and activity at sites to one another. It also provides a flexible means to expand or contract the size of the excavations according to need or as research questions require. Given these advantages, we opted to open large open areas for excavation in most cases, particularly inside Zubārah.

To provide spatial control over the excavations in Zubārah a 5 x 5 meter grid system was laid over excavation areas, which was aligned to the Qatar National Grid (QNG) co-ordinate system. Coordinates were taken from a number of concreted control points placed around the site by QMA. These were also the source for a number of temporary benchmarks used for leveling. The southwest corner point of each 5x5 meter grid square provided a unique identifier for each square, which was used to locate archaeological features, code drawings, samples and finds. At Murayr excavation areas were placed in a more arbitrary manner to allow the targeting of wall alignments and structures more freely (see section 7). In this case the excavation areas were surveyed into the QNG afterwards.

### 4.3. Excavation Methodology

Here we only provide the general outlines of the methodology. More specific aspects of the approach taken in each excavation area are outlined in the relevant report sections below. In general, the exca-

vations relied on the single-context recording system, which has now been widely adopted for urban excavations. In this system, first designed by the Museum of London, a unique number is given to each archaeological feature (deposit, cut, layer, architectural element etc.), and each context is treated as an entity individually (see Schofield 1980). In large measures we followed the outline of the *Archaeological Site Manual* and only adjusted the system in a small way to accommodate the specific conditions required for QIAH. For example, we used the term 'Locus' instead of 'Context', to keep in line with a standard term used in Middle Eastern archaeology. The system proved particularly useful in the case of Al Zubārah, since the archaeological situation at the site was very analogue to many urban sites for which this system was developed. The archaeology was characterized by many inter-cutting and superimposed archaeological features and deposits, which necessitated careful excavation in the correct stratigraphic order to differentiate the phasing and thus dating of the excavated loci. The single context recording method caters for this particular challenge very well.

For recording we used a standard set of pro-forma recording sheets, aligned with the Museum of London system. We differentiated three principle groups of loci: deposits (e.g. pit fills, collapse, layers), cuts (e.g. pits, post-holes) and architectural features (e.g. walls, plaster, thresholds). Each was given a unique number to identify it on drawings and finds tickets. Each excavation area was given a unique site code and a unique group of numbers (e.g. Loci numbers starting at 3000 were used in ZUEP03, numbers starting with 4000 used in ZUEP04). The loci numbers were ordered in stratigraphic matrices in each excavation area to untangle the stratigraphic phasing. One addition to the single context system was the use of Space Numbers. These were used to group together loci numbers that were closely related (e.g. all loci in one room came under one Space number). Again, these were unique for each excavation area. Drawings of each individual context were made in a scale of 1:20 on permatrace, but multi-locus plans of complete phases or as post-excavation plans were also made. Unique sets of drawing numbers were given to multi-locus plans and section drawings in each excavation area, while single-loci plans were simply given the number of the locus recorded.

All bulk finds (ceramics and bone) were given individual bag numbers with the locus number serving as a unique identifier for each. 'Special' finds (coins, metal objects, pieces of jewellery etc.) were given a Field Object number, and where point-provenienced three-dimensionally. Soil samples for flotation were collected from relevant contexts and where possible a minimum of 30 litres was taken from each sampled locus. Ceramic finds were cleaned and catalogued during the excavations, although the volume of material recovered prevented a complete analysis of all the material during the field season. Other finds were catalogued and prepared for storage pending further study and conservation. Botanical samples were stored for processing by specialists during the next field season.

#### **4.4. Regional Survey Methodology**

The survey methodology was geared toward sampling a representative segment of the landscape surrounding Al Zubārah to the north, northeast and east. Four members of the team undertook the survey walking transects aligned to the Qatar National Grid. Initially 1km was divided into quarters with ten transects in each quadrant. Each transect was 50m wide and 500m long and the field walkers were spaced 50m apart. The coordinates for the centre line of each transect were entered into the hand held GPS unit and the field walker walked 25m each side of the medial line.

After two quadrants or 20 transects had been completed it became clear that this proved to be very intensive, but did not seem to yield any more substantial results. To be more time efficient in sampling a large survey area, the remaining half of the 1km was divided into five transects each 100m wide and 1km long. In a change to the methodology the field walkers were spaced 200m apart walking 50m either side of the medial line. Only three of the five transects were walked.

Using this methodology each square km was divided into ten transects of which five were walked. In the process of walking transects the field walkers could scan and record any sites seen in the adjacent transect. Not all transects walked were 1km in length. The coastline defined the western boundary of the survey area and some transects stopped at the coast while others extended onto the intertidal zone. The Al Shamal road was used as an arbitrary eastern boundary at the beginning of the survey that resulted in some short transects. In retrospect this arbitrary boundary should have been ignored and the full 1km length walked. Ten transects (nos. 111-120) were surveyed using a vehicle starting at the Al Shamal road and driving west towards the coast. This decision was taken due to the nature of the terrain that mainly comprised areas of *sabkha* and a lack of sites other than recent beach clearance deposits. The longest transect was 3.45km in length.

In order to sample further inland another forty one transects were completed on the east of the Al Shamal road returning south towards Al Zubārah Fort. Initially transects started at the road and stopped at the edge of a 1km QNG grid square. Transects that started on the edge of the same grid square returning to the road 4km south were just over 2km in length. Field walkers could cover this distance, however, the eastern extent of the survey area was reduced by 1km on two occasions returning south to Al Zubārah. The only other obstacles were the fenced compounds of a private residence, a farm, and a military installation.

Initially surface finds were collected from transects. Each transect was divided into 100m lengths and the finds were collected and bagged separately from each. A transect sheet was completed for each transect. After one hundred transects were completed the collection of surface finds was discontinued. The main reason for this was the paucity of finds. Surface collections were made from some recorded sites but not all since many had few if any finds and others only had glass and tin cans and plastic material that was relatively recent in date.

Hand held GPS units were used to record any site centre point coordinates, as well as to map any linear features and to delineate the extent any sites. Sites were recorded using proforma sheets, conforming to the Qatar sites and monuments database recording sheets.

## 4.5. Summary

The QIAH fieldwork methodology emphasises open-area excavation, coupled with detailed stratigraphic recording and excavation methods. The methodology is orientated along the lines of modern, standard methods used in archaeology elsewhere and allows for detailed observation of stratigraphic relationships and archaeological features. Since the single context recording system used was initially devised for urban sites with complex stratigraphic sequences, it is a highly useful methodology for QIAH. As will become clear in particular in Section 6, the stratigraphy at Al Zubārah was much more multifaceted than could have been assumed at the outset. Several phases were encountered that consisted of discreet archaeological features, whose stratigraphic relationships required detailed ob-

servation and description for them to be untangled.

Our field survey methodology aimed to sample a representative segment of the local landscape to gain a better understanding of the distribution of archaeological sites and features across the Zubārah landscape. The systematic walking of transects on foot provided a detailed coverage of the landscape and allowed us to effectively sample for even ephemeral archaeological sites in the hinterland of Al Zubārah.

While details of these methods were adapted and altered during the course of the project – and are likely to be subject to further small changes as the project carries on – the comparability between and within excavation areas and the proper retrieval and documentation of archaeological data is guaranteed.

## 5. Geomorphology and Geoarchaeology

*By Philip Macumber*

### 5.1 Introduction

Emphasis of the hydrology and geomorphology role in Stage 1 was placed on the landscape around Al Zubarāh, which was strongly influenced by the mid-Holocene high sea level from 7,000 to 4,000 years ago. This transgressed as far inland as the eastern limits of the sabkha near Murayr. (Macumber, 2009), depositing sediments at levels reaching 1-3 m above that of the present sea level. Sampling of the inner beach ridge was undertaken to provide a basis for better understanding the evolution of the landscape around Al Zubarāh. Comments on the dates and the implications for landscape evolution form part 1 of this report.

The emphasis during Stage 2 was to gain a broader understanding of the relationship between occupation and the regional geomorphological/hydrological setting across northern Qatar. Attention was focused on the impact on the landscape by the earlier of the two high sea level phases at Qatar, coinciding with the penultimate interglacial period (Eemian – marine isotope sub stage 5e; Sangamonian in the U.S.; Wurm-Riss in the Alps) commencing about 140-130,000 and lasting to perhaps 115,000 years ago. During this period conditions were similar to today but perhaps warmer and certainly wetter. The Eemian finished about 115,000 years ago with rapid cooling.

Two factors play a major role in the distribution of archaeological sites. These are:

#### *1) Depth to the water table*

As noted in Macumber (2009), the low relief coupled with the high aridity, results in virtually no permanent surface water across northern Qatar. While occupation occurs in response to seasonal rainfall, more permanent settlement is dependant on wells and hence groundwater. The depth to the water table is shallowest in near-coastal settings where the groundwater systems outflow, and are most readily tapped by shallow wells. This is the case with the towns around northern Qatar from Al Zubarāh to Al Ghariyah, and readily seen at Al Zubarāh where fresh water was obtained from a number of hand dug wells located on the higher ground at Murayr. Further inland as the land surface rises, the depth to the water table concomitantly increases and the groundwater contained in the dense cryptocrystalline Dammam Formation limestone was largely beyond reach, prior to the introduction of modern drilling techniques.

#### *2) The extent of the marine transgressions during interglacial high sea levels*

The two phases of high sea level impacting on the coastal fringes of Qatar were that of the last interglacial period from ca 140-120,000 years ago, and the period of the mid-Holocene transgression from

ca 7,000 yr BP until ca 4,000 yr BP. During these periods when sea levels were respectively ca 6 m and 2-3 m higher, the sea advanced inland beyond the present day shoreline for varying distances, but reaching kilometres in some instances. The retreat of the mid-Holocene transgression from about 4,000 yr BP, led to the development of active sabkha around the coast from Kuwait to Oman. While active sabkha are a legacy of the mid-Holocene transgression, the late Pleistocene transgression reached a higher level and passed further inland, resulting in sedimentary deposition either side of the shoreline. As a consequence, these sediments may form the basis for later pedogenesis with the resultant soils being agriculturally superior to the skeletal soils (lithosols) developed on the Dammam Formation Limestone.

Therefore, in terms of occupation, near coastal settings have a strong advantage over inland sites due to the (vertical) proximity to fresh (ground)water resources. Furthermore, the development of better class soils on near coastal sediments deposited during the late Pleistocene interglacial period (Eemian) provides sites for agricultural development. Both factors play a significant role in the occupation of the area between Al Zubarāh and Shamal in northeastern Qatar.

On this basis, the objectives for Stage 2 of Copenhagen University's project in Qatar were:

1. *Finalize the dating of the sequences deposited by the mid-Holocene transgression and regression in the vicinity of Al Zubarāh*
2. *Examine northern Qatar with a view to determining which aspects of the landscape were significant in determining the potential for past occupation, with emphasis on the nature of the 130-110,000 yr old marine transgression in the Al Zubarāh-Al Jumayl area, and nature of the groundwater systems. Relate this to early occupation*

## **5.2 Dating the Mid-Holocene Transgression/Regression at Al Zubarāh**

### **5.2.1 Environmental Setting**

Radiocarbon dating was carried out on shells obtained from a number of locations along a 1.3 km long, 2-3 m deep trench/channel traversing the inner of two former beach ridges; on the outer (more seaward) of which Al Zubarāh was established (Figure 5.1 and Figure 5.3).

One additional date (sample 4, Figure 5.3) was obtained from a pit in a nearby sabkha. At the height of the transgression, the shoreline abutted against rising ground formed by Dammam Formation limestone. At its eastern end the trench stops at a sabkha lying between the inner beach ridge and mid-Holocene shoreline (Figure 5.1) located near Murayr. At its western end, the trench passes from the beach ridge and stops within the sabkha forming part of the supratidal zone connected to the sea and flooded during high tide events such as that shown in Figure 5.2. The beach ridges were initiated as off-shore bars at the height of the transgression and prograded seawards during the regression (Figure 6.1); the sabkha represent later phases in the infilling of tidal inlets or embayments connected to the sea. Samples from the channel for dating spanned the beach ridge (Figure 5.3).



**Figure 5.1:** The location of the trench/channel and the environmental setting from which radiocarbon dates were acquired



**Figure 5.2:** Channel/Trench looking west, during a high tidal event. Sabkha vegetated by halophytes in the foreground, and in the background is the flooded inter and supratidal zones (see Fig. 6.1)



**Figure 5.3:** Radiocarbon sample sites numbered

Towards the western end of the channel where it passes from the beach ridge onto the sabkha, a tongue of Dammam limestone comes to within 150 m of the channel and is present sub-surface in the side and base of the channel (Figure 5.1). From this point westwards, the channel is intermittently cut through dense cryptocrystalline Eocene limestone and varyingly cemented Holocene sediments. The Dammam limestone outcrops as a small pavement near the southern wall of Al Zubarāh, and also just beyond the small sabkha in the north (Figure 5.5 and 5.7) near shell sample site 6. Both occurrences suggest that the Dammam Formation may form a flat albeit slightly undulating base to the mid-Holocene sequences. If this is the case, then it is either a partially buried inland extension of the broad rock platform bounding Al Zubarāh to the west, or perhaps the higher platform observed immediately to the north of Al Zubarāh (Figure 5.6) and elsewhere along the coastline.

If the latter, it may date to the earlier 110,000 to 130,000 Eemian interglacial high sea level represented by the Fuwayrit Formation aeolianite and shallow marine and shoreline sequences (Wusayl Member), now found immediately to the north near Furayhah. However, while the high platform is present, sediments from this earlier interglacial event were not identified in the Al Zubarāh embayment, despite being present in the area immediately to the north, and further along the coast towards Shamal.

### 5.2.2 Radiocarbon Dates

When sampling, the deeper parts of the channel were not readily accessible, being partially infilled by sediment and having a hyper saline water table just below the surface, with halite forming in pits cut below the water table. However material from deeper in the channel sequence occurs on the spoil heaps bounding the channel. A feature of the spoil heaps was the presence of large numbers of *Chione* sp shells from the deeper parts of the channel. Although present, these were not so prevalent in the exposed channel walls which were instead cerithid-rich. Larger and heavier mollusc shells are more prevalent towards the western end of the channel where marine sediments are very thinly draped over shallow Dammam Formation, present in the channel walls. The more robust *Chione* shells from deeper in the sequence represent the oldest material dated from the sites.

Within the channel, samples were obtained mostly from two small pits (numbered 'A' and 'B'), 'A' being from slightly higher and 'B' slightly lower in the sequence (Figure 5.8b). This approach was designed to provide a check on the consistency and integrity of the dates at each site. This was carried out from five localities over a distance of 620 m, spanning the length of the beach ridge (Figure 5.8a).

At two of the sites, two additional samples (4B and 5C) were obtained from *Chione* shells thrown out at the time of construction from deep within the now partially infilled channel, at depths no longer accessible, but considered to represent older samples from deeper in the sequence. In addition a further sample (Sample 6 - Wk 26489) was taken of *Chione* shells from one of a number of small pits in a small outlier of sabkha from which halite was extracted. This site lies in the sabkha about 0.7 km to the north east close, to Al Zubarāh (Site 6, Figure 5.3).

A heavily cemented conglomerate (coquina) of *Chione* and cerithid shells was described from the





**Figure 5.4:** Channel crossing beach ridge showing regressive strands

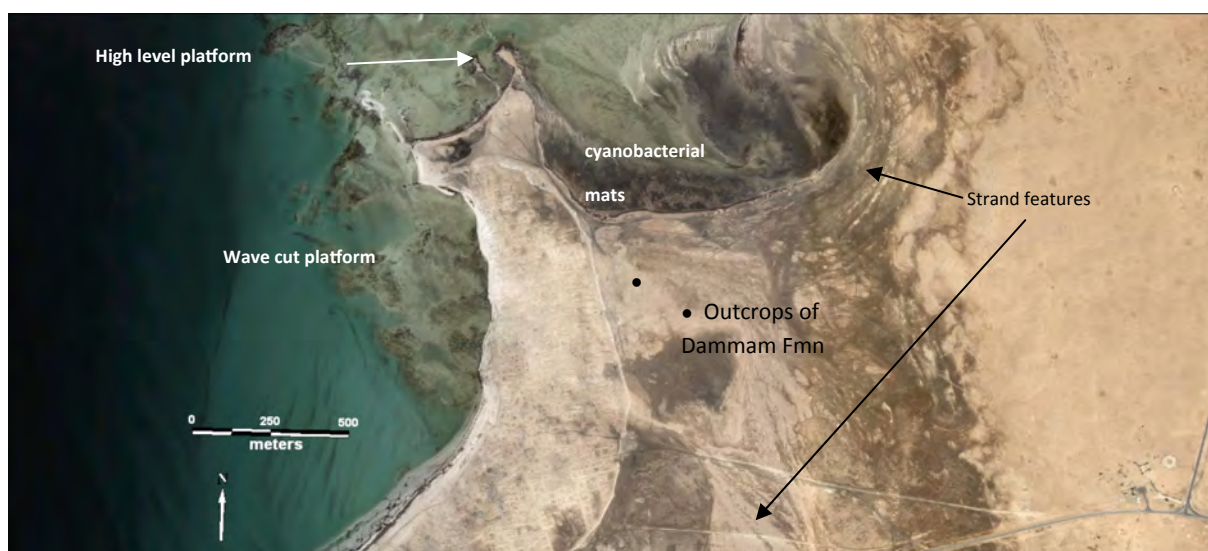


**Figure 5.5:** Outcrop of planated Dammam Formation on the sabkha edge near Al Zubarah





**Figure 5.6:** Elevated wave-cut platform forming the base of a small promontory beyond Al Zubarah. Appears to relate to a higher (mid-Holocene?) level

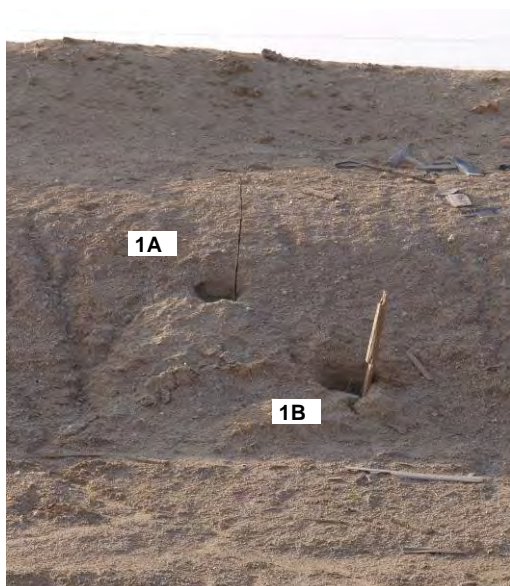


**Figure 5.7:** Distribution of wave cut platforms and cyanobacterial mat development in the vicinity of Al Zubarah





**Figure 5.8a:** View along the channel



**Figure 5.8b:** Close up of sample sites 1A (3,717cal BP +/- 109) and 1B (3,932cal BP +/- 127)



**Figure 5.9:** Chione shells deposited with marine breccia (Futaisi? Member of the Fuwayrit Formation) representing the base of the last interglacial transgression

spoil heaps of the western parts of the channel (Macumber, 2009). Further to the north of Al Zubarāh, large numbers of *Chione* shells were observed in coastal sections such as that occurring south of Al Arish. There, *Chione* shells were deposited with basal marine sediments (Figure 5.9), including reworked Dammam Formation, overlying Dammam Formation, all belonging to the last interglacial period from 130-110,000 years ago. A *Chione* coquina was noted by Ortlieb (1991) from a 129,000 year old late Quaternary shoreline of California where it was interpreted as having formed at the height of the interglacial marine transgression. Although much younger, the *Chione* samples from deeper in the sequence at Al Zubarāh are deemed to similarly represent the oldest part of the marine sequence at the height of the mid-Holocene marine transgression. This conclusion is supported by the corrected dates ranging from 5,842  $\pm$  93 yr BP to 4695  $\pm$  101 yr BP. The calibrated ages of shell samples from Al Zubarāh are given in Table 1 and Figure 5.11, with the dates from the deeper *Chione* sequence shown in blue (see also Appendix IX).

### 5.2.3 Discussion of Radiocarbon Dates

The radiocarbon age dating and calibration calculations were carried out at the Waikato University Laboratory in New Zealand and the dates are in accordance with the Marine 09 calibration curve; a marine reservoir correction value of 230 $\pm$ 65 was applied. Calibrations were courtesy of Dr Fiona Petchey.

The ages from the Al Zubarāh samples fall into two groups - those from the deeper *Chione* shell sequences were older than those from the shallow sequences in the channel walls. The younger channel samples show a consistency both vertically and laterally, and in all cases the samples from slightly deeper in the sequence were similar to but slightly older than the overlying samples, supporting the reliability of the results. Laterally there was a consistent trend from the eastern end of the channel to the western end with progressively younger ages. Only in the cases of site 5 and 1 at the far eastern end of the channel was this trend reversed. However the ages of the two sets at these sites were not significantly different, and were vertically consistent at each site. The simplest explanation is that the samples from site 1A and 1B were taken from slightly lower in the sequence, and hence older than from site 5A and 5 B. No surveyed leveling of the sites was carried out at the time, as the sampling was undertaken in order to gain a broad view of the likely ages, but with the results far outstripping the expectations. Whatever the case, the two dates at the far eastern end of the channel closest to the inland limit of the transgression (samples 5A and 5B) were essentially the same age at 3,515  $\pm$  90 and 3,548  $\pm$  93, providing a record of the early stages of the regression.

The *Chione* samples from deeper in the sequence have ages ranging from 5,842cal BP  $\pm$  93 in the case of the sabkha sample to 4,865cal BP  $\pm$  35 and 4,695cal BP  $\pm$  101 from the channel. At Al Zubarāh, they are deemed to represent the period of still stand at the height of the transgression, which may have continued until after 4,000 yr BP. The mid-Holocene transgression has been variously put at between 7,000 to 4,000 yr BP, but with claims of both earlier and later incursions. While there is a general agreement on the approximate time of the transgression, the range and duration varies between studies. The *Chione* based dates marking the height of the transgression at Al Zubarāh are in close accord with the observations of Williams and Walkden (2002) who comment that there





**Figure 5.10:** Chione sp. and cerithid shells alongside a salt pit hole in the sabkha. A calibrated Chione date of 5,842  $\pm$  93 yr BP was obtained from a nearby salt pit



**Figure 5.11:** Calibrated radiocarbon ages from beach ridge and sabkha to the east of Al Zubarah. The dates coloured blue are from deeper Chione samples collected from the surface

was widespread evidence for a mid-Holocene high sea level in the southern Arabian Gulf which peaked at 1-2 m above present sea level ca. 5,500 yr BP. In the Umm Tays area east of Shamal, it is claimed that the transgression was between 7,000- 5,000 yr BP (Puls et al., 2008), but with beach sediments as old as 7,700 BP and as young as 1,690 years B.P. The Al Zubarāh dates fit within this period, but extend forward to 1,066 yr BP.

The oldest dates on the beach ridge are 3,932cal BP +/- 127 (site 1B) and 3,717cal BP +/- 109 (site 1A), but sedimentation was still underway at site 5 furthest east at 3515cal BP +/- 90. Both site 1 and 5 are within ca 0.5 km of the shoreline at Murayr. Whether the sediments from Site 1 represent deposition while the transgression was at its peak is unclear, but whatever the case, the dates indicate that the transgression peak lasted several thousand years from ca 5,842 BP. The eastern channel dates suggest that the regression was underway soon after 4,000 yr BP and certainly well underway by ca 3,515 yr BP when sediments were deposited about 0.5 km seawards of the transgression's limit near Murayr. The regression across the 620 m of channel occurred between 3,515 and 1,066 yr BP, and it took 2,450 yr to retreat 620 m giving a rate of retreat of about 0.25 m/yr. This is about one third of that given for an average progradational range of 0.75 m/yr by Lokier and Steuber (2008) at Abu Dhabi.

No	Lab No	North	East	Description	Conventional	Calibrated Age	d <sup>13</sup> C	d <sup>14</sup> C
3A	Wk-26482	25.9718	51.0303	Trench side	1741 +/-36	1066 cal BP +/-83	4.5 +/-0.2%	194.9 +/-3.6%
3B	WK-26483	25.9718	51.0305	Trench side	1880 +/-41	1196 cal BP +/-80	4.3 +/-0.25%	-208.7 +/-4.1%
2A	WK-26480	25.9722	51.0318	Trench side	2208 +/-46	1538 cal BP +/-99	4.2 +/-0.2%	-240.4 +/-4.3%
2B	WK-26481	25.9722	51.0318	Trench side	2234 +/-43	1568 cal BP +/-98	4 +/-0.2%	-242.7 +/-4.1%
4	WK-26484	25.9729	51.034	Trench side	3226 +/-38	2777 cal BP +/-89	3.4 +/-0.2%	-330.8 +/-3.2%
4B	WK-26485	25.9729	51.034	Chione shell surface sample	4745 +/-41	4695 cal BP +/-101	5.4 +/-0.2%	-446.1 +/-2.8%
1A	WK-26478	25.9735	51.0357	Trench side	4007 +/-50	3717 cal BP +/-109	3.6 +/-0.2%	-392.8 +/-3.8%
1B	WK-26479	25.9735	51.0357	Trench side	4169 +/-62	3932 cal BP +/-127	3.7 +/-0.2%	-404.9 +/-4.6%
5A	WK-46286	25.9737	51.0361	Trench side	3843 +/-34	3515 cal BP +/-90	3.8 +/-0.2%	-380.2 +/-2.6%
5B	WK-26487	25.9737	51.0361	Trench side	3872 +/-33	3548 cal BP +/-93	3.3 +/-0.2	-382.5 +/-2.5%
5C	WK-26488	25.9737	51.0361	Chione shell surface sample	4865 +/-35	4866 cal BP +/-106	5 +/-0.2%	-454.3 +/-2.3%
6	WK-26489	25.97952	51.03147	Chione shell surface sample	5703 +/-40	5842 cal BP +/-93	5 +/-0.2%	-508.3 +/-2.4%

**Table 5.1:** Radiocarbon data for Al Zubarah area





Figure 5.12: Cited locations between Al Zubarah and Al Jumayl



Figure 5.13: Aeolianite near Fuwayrit

There is a marked similarity between the dates and events recorded at Al Zubarāh and those obtained elsewhere in Qatar, such as that described by Taylor and Illing (1969) who categorized the Holocene deposits into 4 groups, relative to present sea level. The Al Zubarāh strand line sequence falls into a category referred to by them as their “old strandline deposits” standing 1.5 m to 2.5 m above present sea level. They quote 3 dates of 4,200 +/- 200 years, 4,340 +/- 180 years and 3,930 +/- 130 years, noting that the Qatari deposits consist predominantly of cerithid gastropod shells. All three dates fit comfortably within the range obtained from the Al Zubarāh suite close to the height of the transgression. .

Evans et al (1969) note that in the case of the sabkha at Abu Dhabi, the marine transgression began about 7,000 years ago and reached a high of about 1 metre above present sea level about 4,000 years ago. At the Abu Dhabi sabkha, progradation of the intertidal and supratidal sediments marking an apparent fall in sea level began about 3,750 years ago, with the zone of algal mat development moving seaward until about 1,000 yr BP, when it disappeared. Lokier and Steuber (2008) considered that the disappearance of the algal mat corresponds to a marked decrease in progradational rates observed by them at the Abu Dhabi sabkha, and suggest that it may represent a regional event. At Al Zubarāh, the 1066 years BP date also marks the approximate limit of the progradation of the beach ridge and hence corresponds closely in time to the end of regression

Therefore at Al Zubarāh, mid-Holocene sea levels had reached their peak of ca 2-3 m above present sea level at ca 5,800 yr BP and remained high to about 4,000 yr BP. The regression began soon after 4000 yr BP, and is represented by the strand line sequence dated from ca 4,000 yr BP to 1,066 yr BP (calibrated). It seems likely that the outer strand line, on which Al Zubarāh was later established, was formed at the same time as the inner strand line. The implication is that a significant tidal inlet existed between the two over much of the last 4,000 years, the remnants of which are still present, albeit partially reduced by the development of a supra-tidal zone and sabkha in the upper reaches.

### **5.3 The landscape between Al Zubarāh and Al Jumayl**

At Al Zubarāh, the limits of the mid-Holocene transgression are marked by a low scarp cut into the Dammam Limestone near Murayr. Al Zubarāh is built on a beach ridge, one of two formed at the time of the regression commencing about 4,000 years ago to ca 1,066 yr ago. Several active sabkha occur between Al Zubarāh and Murayr. Most active sabkha in the UAE and Qatar are less than 2 m above sea level and relate to the mid-Holocene regression, and deemed to be less than 4,000 years old in line with the regression, dated above. However, there are a number of varyingly active palaeo-sabkha slightly higher in the landscape related to the earlier late Pleistocene marine transgression which reached an elevation of ca 6 m above the present sea level. An example is at Al Khor, documented in a second part of this report. A feature of the Al Khor palaeo-sabkha is the presence of a surficial gypsite layer and the dehydration of gypsum to give a near white anhydrite surface. Palaeo-sabkha are also common between Al Zubarāh and Al Jumayl, at times with cemented surfaces forming hard pavements.





**Figure 5.14:** Aeolianite at Jabal Furayhah



**Figure 5.15:** Pleistocene shallow marine and beach sediments of the Dabb'iya Member with red-brown palaeo sabkha in the background, indicating the extent of deflation



**Figure 5.16:** Remnant of late Pleistocene marine deposits 2.1 km south of Al Arish, with a basal lag of Dammam Formation clasts, overlain by cemented shelly calcareous silts. Active sabkha is visible in background.



**Figure 5.17:** Ruins of Khidaj established on late Pleistocene marine sequences 2 km north of Al Khuwayr



**Figure 5.18:** Cemented late Pleistocene beds forming basal marine layers below Khidaj (top and background), 3 km northeast of Al Khuwayr





**Figure 5.19:** Late Pleistocene marine sequences with gypsite capping outcropping to the east of Khidaj



**Figure 5.20:** Near-beach shield-like pavement made of brecciated limestone and cemented carbonates, forming a ridge paralleling the coast. Al Jumayl is in the background





**Figure 5.23:** Gypsite surficial layer containing in situ shells, from palaeo-sabkha near Al Khuwayr



**Figure 5.24:** Dense white anhydrite pavements forming part of a red-brown palaeo-sabkha surface





**Figure 5.21:** Breccia outcropping on ridge surface, sabkha in the background



**Figure 5.22:** Lithographs on cemented marine sediments north of Al Jumayl

Landwards of the active sabkha, the coastal plain extending northwards from Al Zubarāh to beyond Al Jumayl consists of intermittent outcrops of Eocene Dammam Formation limestone, and late Quaternary (Eemian) marine sequences including areas of palaeo-sabkha. Between Furayhah and Al Arish, a feature of the Eemian transgression is the presence of aeolianites such as that forming Jabal Furayhah. Aeolianites (palaeo-dunes) are a feature of the transgression in northern Qatar, which occur as low hills around the coast, such as that at Fuwayrit on the north-eastern coast, and at Jabal Freyer, near Al Zubarāh. The aeolianite forms the most extensive exposure of Pleistocene deposits in Qatar. At Fuwayrit (Figure 5.13) the aeolianite reaches a height of 20 m and forms a 2.5 km long ridge parallel to the coast.

North of Al Zubarāh, aeolianite and related shallow marine and beach sequences extend inland to the north east from Jabal Furayhah (Figure 5.14) as isolated outcrops, their base lying roughly along the 4 m contour - (Macumber, 2009). The outcropping marine and beach deposits are 1 to 2 m thick (Figure 5.15), suggesting that the level reached by the transgression was about 6 m above sea level. Erosional remnants are often several metres higher than adjacent (palaeo) sabkha which have been cut across the marine sediments, and near the coast they commonly form long ridges and small hillocks between the active sabkha and the shoreline (Figure 5.15, 5.19 and 5.20). Erosion of the marine sequences is mostly by wind (deflation), leaving small hummocks of more resistant often heavily cemented material on the surface. The extent of erosion is determined by the level of the water table, since deflation ceases once the sediment has been removed down to the top of the moist capillary fringe – hence the name *water table bevelling*. The process results in the development of extensive erosional flats and, where cemented, flat pavements (Figure 5.24), deflated several metres below the original surface. The late Quaternary sabkha are here referred to as palaeo-sabkha to differentiate them from the more recently formed sabkha which relate to the mid-Holocene regression. The processes are the same, in that they were areas of regional groundwater outflow formed as the sea retreated from its 6 m high. They remain still variously active areas of regional groundwater discharge.

The late Quaternary stratigraphy has been formalized and the aeolianite is the Al Wusayl Member of the Fuwayrit Formation, a suite of shallow marine sediments and derived aeolianites deposited during the last interglacial when sea levels reached 6 m above that at present (see Williams and Walkden 2002). On the basis of the bedding within the aeolianites it was determined that the wind direction of the shamal at the time of deposition was from the north east, and therefore different from that of today where it comes from the north west. The initial transgression led to deposition of shallow marine deposits of the Futaisi and Dubb'iya Members and an aeolian Al Wusayl Member, each separated by a period of sub-aerial erosion. The Futaisi and Dubb'iya Members represent sea levels reaching 1.5-2 m and ca 6 m respectively above present sea level. These sediments are the source of the overlying aeolianite.

Most commonly the basal transgressive marine unit in the Al Zubarāh to Shamal area consists of heavily cemented breccias made of clasts of reworked Dammam Formation overlying planated Dammam Limestone rock platform. The most prominent occurrence forms the base of the small island off Al Khuwayr, but other important coastal occurrences are found southwest of Al Arish and underlying the abandoned village of Khidaj, north of Al Khuwayr. In all cases strongly cemented breccias are overlain by heavily cemented fossiliferous carbonate sequences. Individual beds of brec-

cia and fossiliferous carbonate alternate, suggesting that the transgression was ebbing and flowing, but with a net overall rise. It was not clear whether both the Futaisi and Dubb'iya members were preserved along the northwest coast, but this seemed likely given the various disconformities visible in the basal sequences (Figure 5.16).

Similarly, the ruins of Khidaj are located ca 3 km north of Al Khuwayr on a small promontory of outcropping late Quaternary marine sediments visible in the cliffed shoreline (Figure 5.17 and 5.18). A suite of finer grained calcareous sediments with a variously developed gypsite cap occurs immediately inland of the town, bordering a large sabkha. Surficial diagenetic and pedogenic gypsite is a feature of the palaeo-sabkha sequences near Al Khor, and is also found as small resistant mounds in sabkha areas in the Furayhah – Al Khuwayr area where it is also seen as indicating a degree of antiquity not seen on the more recent mid-Holocene sequences (Figure 5.19 and 5.23).

Inland from the coastal sections, outcropping heavily cemented marine sequences may at times form low linear shield-like ridges running parallel to the coast, and are commonly backed by sabkha on the landwards side (Figure 5.20). This is the case north of Al Jumayl, where a long shield-like ridge mostly consists of densely cemented cobbles and breccia (Figure 5.21) such as occur as basal transgressive sequences in the coastal sections, and are likely to be erosional remnants of beach deposits, preserved by their dense cementation. The ridge extends for several kilometre, and may underlie Al Jumayl (Figure 5.20). At its northern end, there are lithographs inscribed into the surface (Figure 5.22).

North of Furayhah, much of the area between the coast and the Shamal Road consists of palaeo-sabkha with a red-brown to white surface formed across late Pleistocene marine sediments. Commonly the otherwise red-brown surface is broken by areas of white, where marine cerithid shells abound. Elsewhere the white surface marks the presence of dense anhydrite formed by the diagenetic and pedogenic alteration of gypsum surficial layers. The sabkha, while still active groundwater discharge areas today, initially formed following the late Pleistocene regression, and the gypsite caprock, where present, was initially infused into the surficial sediments by upwards moving saline groundwater. It is occasionally preserved on the surface as discrete erosional remnants forming small mounds and underlain by marine sediments. In Figure 5.23 diagenetic gypsite cements marine sediment with the shells preserved. In a number of instances the flat sabkha surfaces have distinct hard pavements formed by gypseous sediments which are partially altered to anhydrite (Figure 5.24).

## **5.4 Internal drainage patterns and near-coastal embayments**

The upper limits of the late Pleistocene marine transgression are approximately marked by the 6 m contour. The contour also passes inland along a number of shallow embayments or inlets cut into the higher ground bounding the coastal plain. The embayments are small depressions often where shallow stream traces (fluves) emerge from the higher ground onto the coastal plain (Figure 5.25 and 5.34). Across Qatar, the drainage system which forms the shallow fluves has considerable antiquity which reflects processes probably commencing in the late Tertiary period and especially active during the last interglacial period from 130-110,000 yr BP, when the climate was significantly wetter.



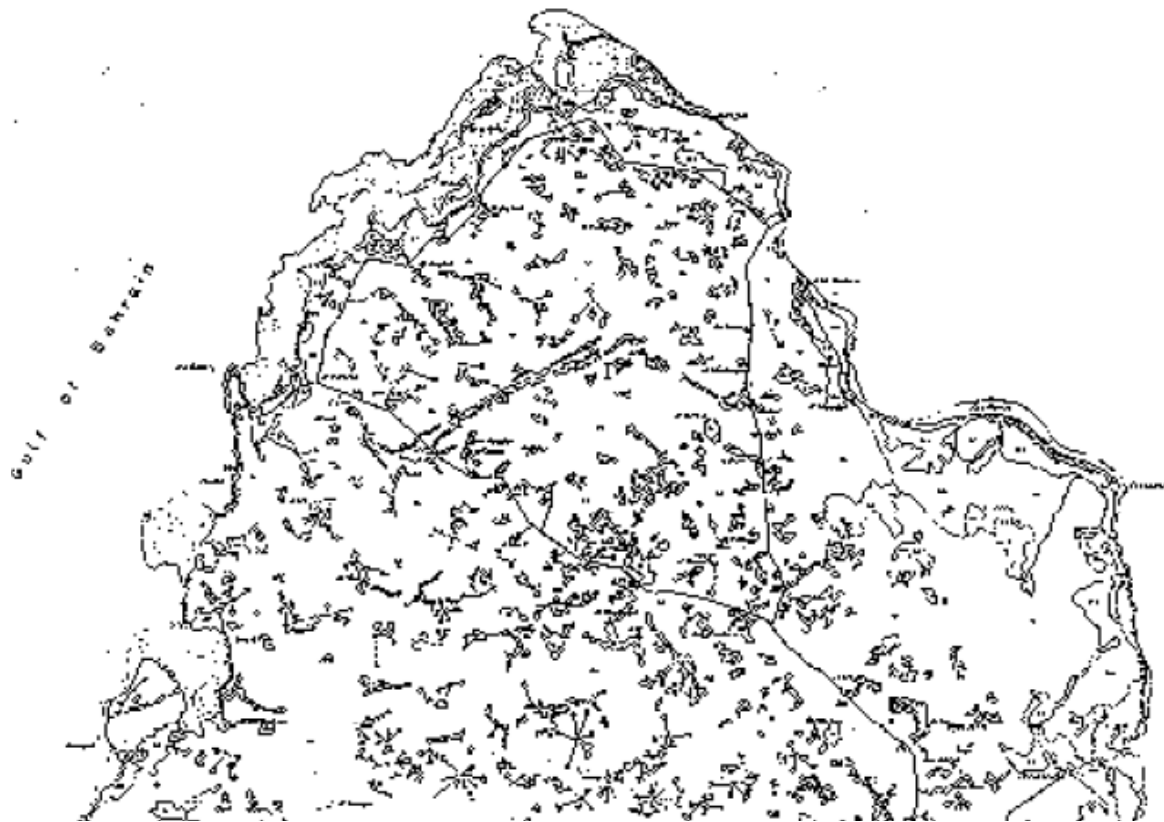


Figure 5.25: Drainage pattern across northern Qatar (Eccleston et al., 1981)

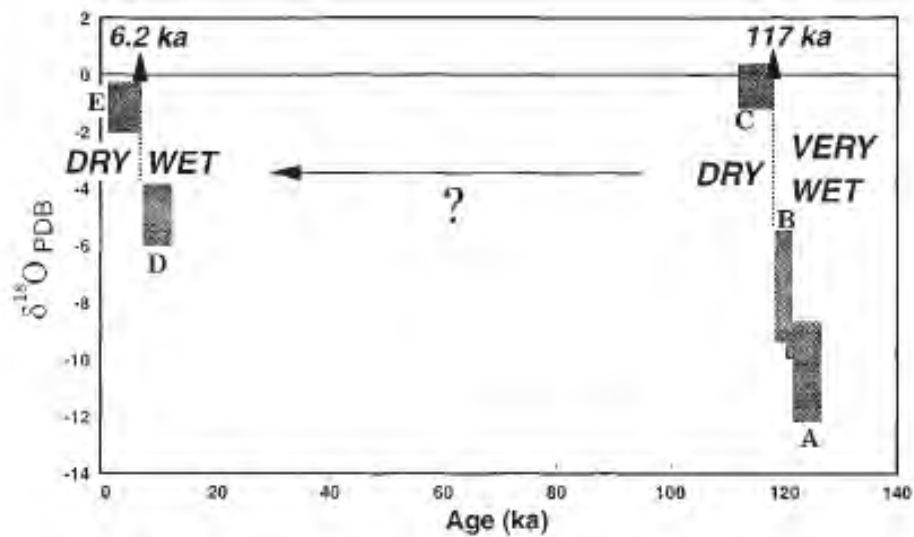
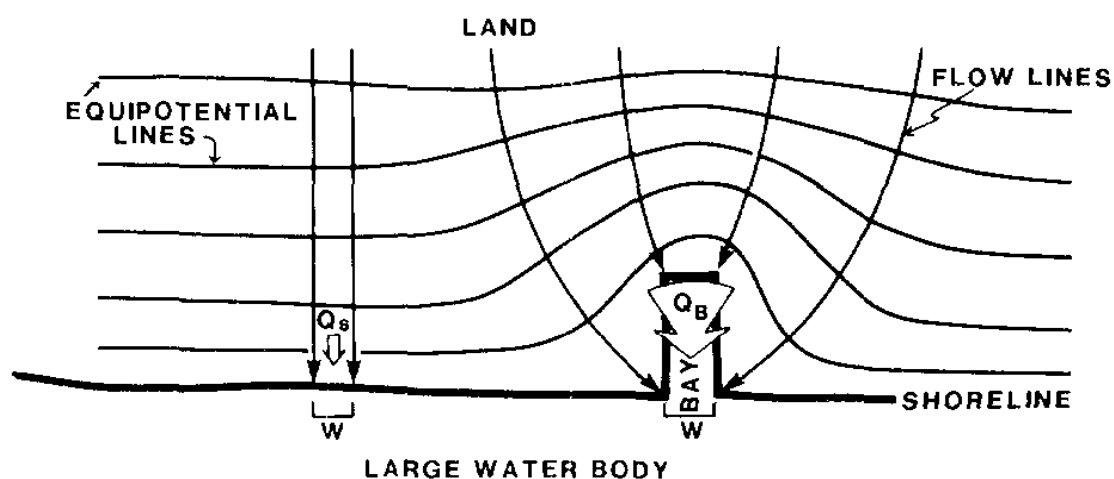


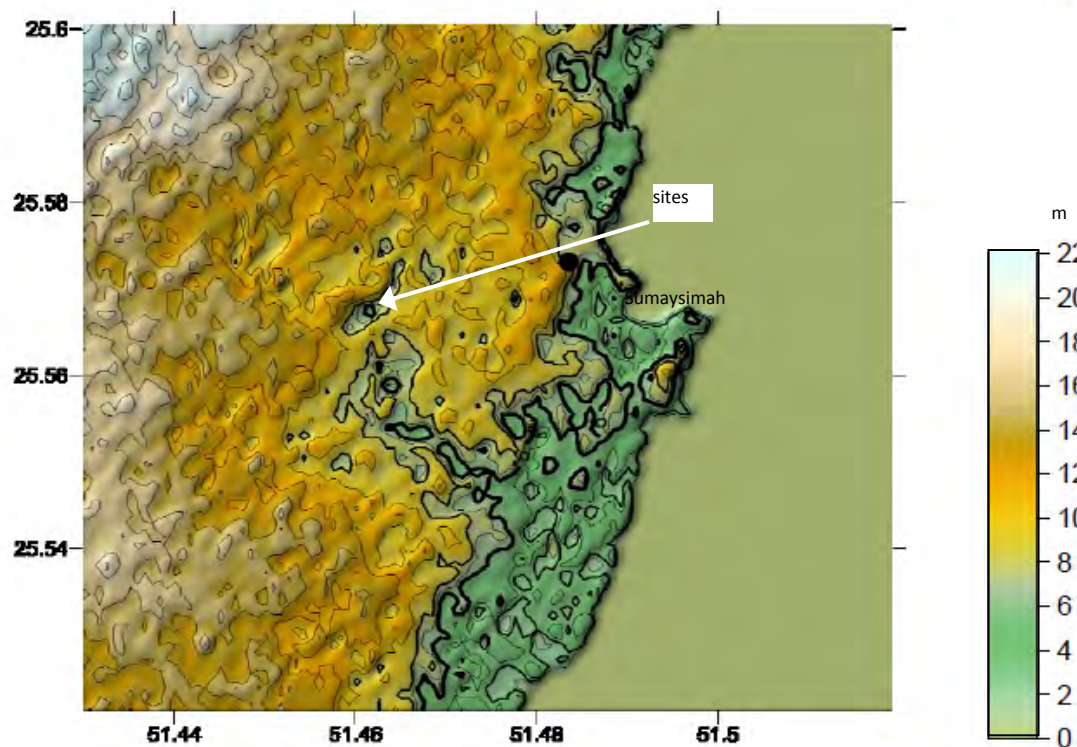
Figure 3. Plot of ranges of  $\delta^{18}\text{O}$  values (PDB is Peedee belemnite) for speleothems from Hoti Cave versus absolute age, and interpreted climatic conditions. Sample data: A—flowstone, B—lower part of stalagmite H-4, C—upper part of stalagmite H-4, D—stalagmite H-5, E—modern stalagmites. Postglacial transitions from wet to dry occurred ca. 117 ka and 6.2 ka.

Figure 5.27: Depiction of the wet phases in the early Holocene and late Pleistocene (Burns et al., 2009)





**Figure 5.27:** Distortion of groundwater flow and equipotential lines towards the embayment (Cherkauer and MacKereghan, 1991). The increased outflow is reflected by the large outflow ' $Q_s$ ' compared with the non-embayment situation ' $Q_s$ ' shown to the left



**Figure 5.28:** D representation of topography in the vicinity of the site near Sumaysimah at the head of a depression graded to the 6 m high sea level stand (dark contour)



**Figure 5.29:** Partially infilled well at site near Sumaysimah with surrounding grassed area

However, because of the low relief and low rainfall, there is mostly only a small upper catchment to support the fluves, with instead, internal drainage being the norm, based around the rawdha.

At the height of the late Pleistocene transgression, the mouths of the fluves were drowned, and blanketed by marine sediments now forming the coastal plain. The high sea level raised base levels of sedimentation to 6 m above those at present, and this would in turn have led to alluvial sedimentation occurring upstream of the coast at the time. At the ancient shoreline, fluvial wadi-fill sequences merge with coastal and shallow marine sequences to produce a shallow, albeit localized aquifer system, a focus for both groundwater flow and storm run-off leading to enhanced recharge. Factors in the initiation and growth of the fluves and embayments/inlets were wetter climates and focused groundwater inflow.

## **5.5 Wetter climate during the last interglacial (Eemian)**

Williams and Walkden note that there was abundant and widespread dissolution (palaeo-karstic) pits found in the top surface of the Futaisi Member, are believed to represent the former positions of abundant trees or large plants, and provide compelling evidence for a pluvial episode during this period. This observation supports other views as wet conditions during both the late Pleistocene interglacial and the early Holocene were indicated by the monsoon pollen index from east Africa (Van Campo et al., 1982) and the U-Th and stable isotope data of stalactites from the Hoti Cave in Oman. Furthermore, the Hoti cave data suggests that during the period represented by marine isotope stage

5e, and coinciding with the Eemian interglacial, southern Arabia was considerably wetter than in the early Holocene (Figure 5.26).

## **5.6 Concentration of groundwater outflow into embayments**

The regional groundwater flow in the vicinity of embayments is captured by the distortion of the equipotential lines (Figure 5.27) caused by the embayment's penetration into the groundwater system. Once developed, the embayments are self-perpetuating and may expand inland by basal sapping since they become a focus for groundwater outflow. They were most likely actively incising in the past during the wetter phase of the Eemian since the floors of the embayments are commonly at levels of 6 m, and graded to the high sea level; and perhaps also during the early Holocene wet period. At these times groundwater tables would have been higher in response to the higher sea levels. As a focus for water, the bays and inlets into the Dammam Formation at the head of the coastal plain provide the optimum physical setting for early near coastal settlement, and such areas were later tapped by shallow coastal wells, such as those at Umm Jassim and Sumaysimah (see below). The areas within the vicinity of the embayments therefore offer perhaps the most likely areas for locating sites of early occupation in Qatar.

As a focus for water, the bays and inlets into the Dammam Formation at the head of the coastal plain provide the optimum physical setting for early near coastal settlement, and such areas were later tapped by shallow coastal wells, such as those at Umm Jassim and Sumaysimah (see below). The areas within the vicinity of the embayments therefore offer perhaps the most likely areas for locating sites of early occupation in Qatar.

Apart from their groundwater potential, these areas produce better quality soils than is the case for the bare Dammam Formation limestone, and their significance for early agriculture in the Al Zubarāh-Al Jumayl area is discussed below. One such setting was investigated at Sumaysimah, near Al Khor when determining the archaeological potential of the Al Khor Aerospace city site.

## **5.7 The Sumaysimah example**

The occupation near Sumaysimah covers an elongated area of grassed flats located on either side of the Sumaysimah Road to the east of the Al Khor-Doha Road about 3 km from the coast (Figure 5.28). It contains many dug wells, both modern and older (Figure 5.29 and 5.32), agricultural walls (Figure 5.30), and the ruins of a small settlement (Figure 5.31). These agricultural sites lie to the north of the Sumaysimah road, but the settlement ruins occur to the south of the road.

The area lies within a slight elongated depression at the head of a linear embayment formed during earlier phases of higher rainfall (Figure 5.28). The wells demonstrate shallow fresh groundwater, while the structure and walls suggest that the area has been occupied over some time. As noted above such situations are probably representative of a number of near coastal settings developed wherever small embayments have formed. The elongated nature of the depression suggests that it has been a





**Figure 5.30:** Walls and grassed plain at the northern agricultural site near Sumaysimah, with trees marking site of modern well in the background

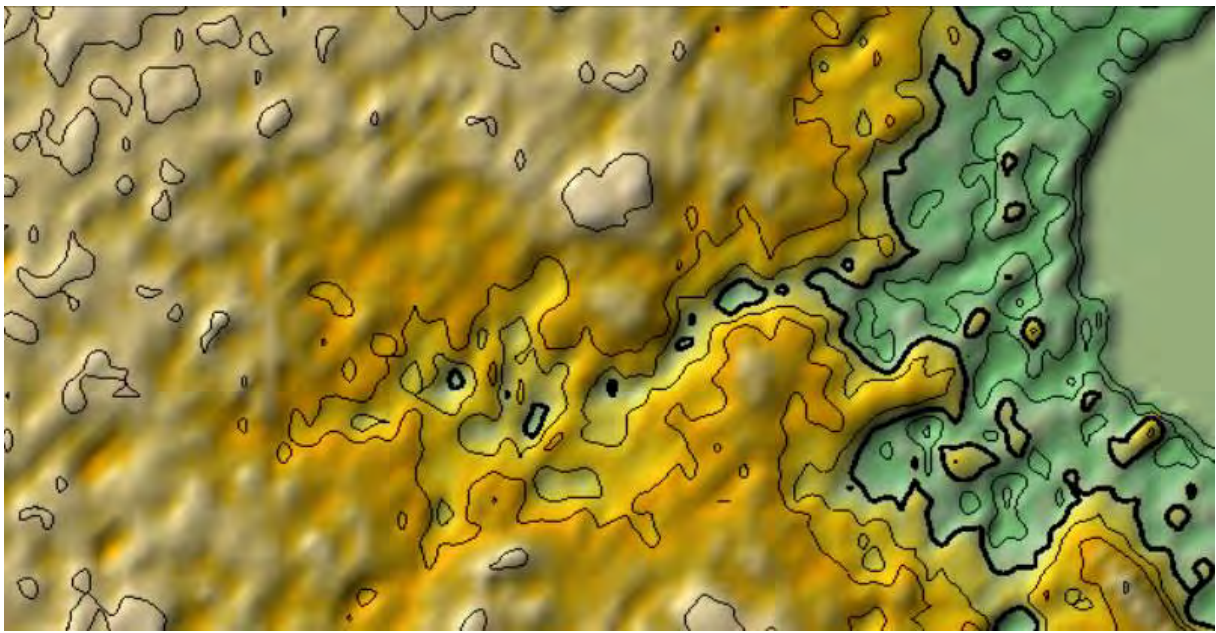


**Figure 5.31:** Ruins to the south of the Sumaysimah Road



**Figure 5.32:** Modern (abandoned) well at Sumaysimah site





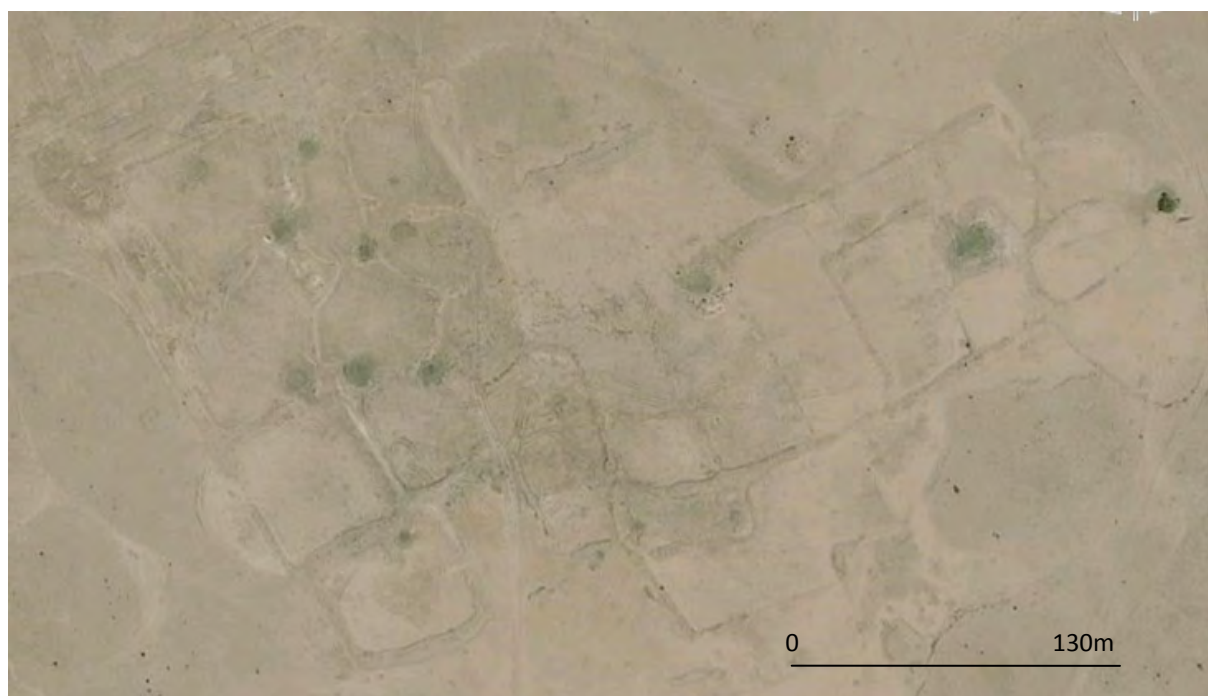
**Figure 5.33:** Embayment in coastal plain, to the south of Sumaysimah, with darker 6 m



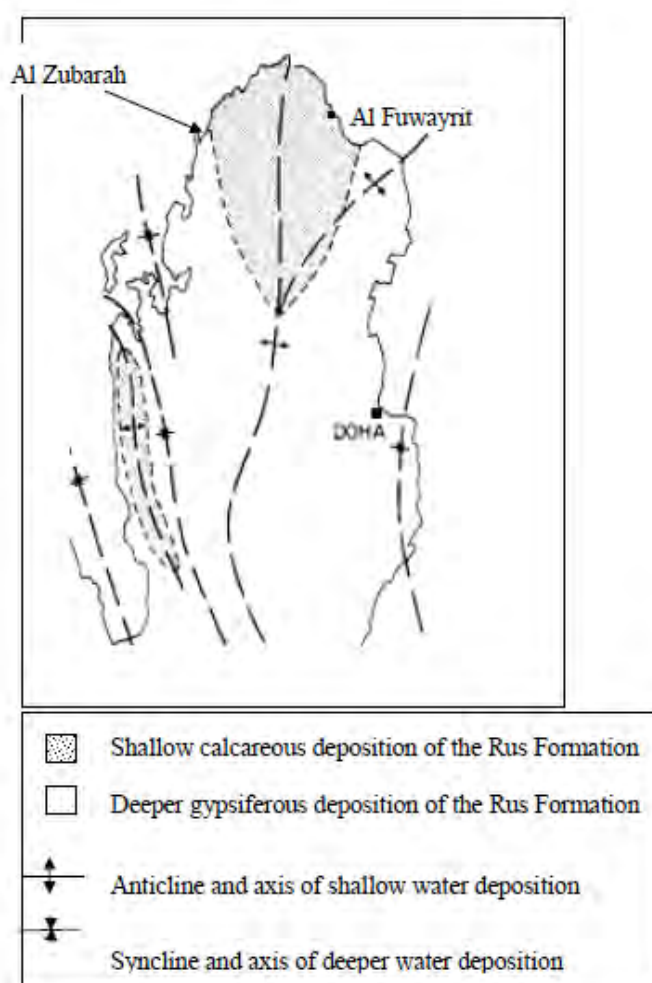
**Figure 5.34:** Distribution of settlement in the Al Zubarah – Jumayl near-coastal area. Note faint drainage lines (fluves) passing northwards towards Qala'at Al Thaqab and through Shadiraya.



**Figure 5.35:** Map of northern Qatar showing coastal town density (Qatar Visitor, April 2010)



**Figure 5.36:** Farm layout at the abandoned Muhayriqat irrigation settlement near Halwan – deeper green patches are locations of infilled wells closely linked to adjacent fields



**Figure 5.37:** A zone of better quality groundwater in northern Qatar (A) is associated with the calcareous facies of the Rus Formation. The potentiometric surface and direction of groundwater flow in the Rus Formation (B) are also shown

focus for water draining from the limestone, having been initiated perhaps as a coastal spring, which migrated inland by spring head sapping. In addition the depressions become collectors for storm runoff from the adjacent areas, further recharging the localized aquifer. The 6 m contour marking the limits of the late Quaternary marine transgression is shown as a darker contour in (Figure 5.28). The contour passes up the embayment towards the archaeological site, suggesting that at the time of the late Pleistocene transgression the drainage line was active, and may perhaps have been tidal. A second example of a linear embayment with similar characteristics and a base level at ca 6 m is present 9 km south of Sumaysimah (Figure 5.33). It supports the view that the depressions were in place at the time of, and are graded to, the 6 m high late Pleistocene sea level. After the end of the last interglacial at ca 110,000 yr ago, the depressions provided a focus for groundwater and surface water runoff, and hence were optimal settings for occupation.

A number of larger pumping stations associated with the modern wells indicate that in more recent times attempts were made to more intensely utilize the groundwater resource, however the stations have been abandoned, possible because of depletion of the freshwater lens and/or increased groundwater salinity. The abandonment of many recently constructed wells and bores across northern Oman reflects the fragility of the groundwater system to intensive exploitation, as noted by Eccleston et al..

## 5.8 Occupation in the Al Zubarāh-Shamal Region and its Hinterland

### 5.8.1 The distribution of settlements in the area between Al Jumayl and Al Zubarāh

There have been a number of towns on the coastal plain and further inland between Al Zubarāh and Al Jumayl, supported by small but intensive irrigation areas such as that of the Muhayriqat irrigation settlement, minor irrigation around Murayr and a larger irrigation settlement south of Al Jumayl, near Umm Jassim, all now abandoned (Figure 5.34 and 5.35). The immediate area surrounding the Umm Jassim irrigation settlement contained at various times, the towns of Al Jumayl, Al Khuwayr, the Ruwada Fort and two small villages of Khidaj and Al Nabaah. To the south is Shadiraya. Additional irrigation was carried out near Qala'at Thaqab (Figure 5.34). More generally, the density of towns across northern Qatar between Al Zubarāh and Fuwayrit is seen as reflecting the availability of good quality groundwater occurring in the calcareous zone within the otherwise gypseous Rus formation aquifer (Figure 6.38), with the highest town density between Al Jumayl and Al Arish (Figure 5.35), probably reflecting optimum groundwater availability and the late Quaternary palaeogeography.

The irrigation areas at Muhayriqat and near Al Jumayl would have been significant contributors to the sustenance of the coastal and nearby inland towns. In all cases irrigation was dependant on shallow wells, which in the case of the Muhayriqat settlement, were developed in thin alluvium overlying Eocene limestone in a rawdha area, where direct seasonal precipitation and storm runoff from nearby higher ground infiltrated to recharge the shallow groundwater system (Figure 5.36).

However this was only partially the case at Murayr and at the Umm Jassim irrigation area south of Al Jumayl where irrigation was sited in areas where fresh regional groundwater flowing from the hinterland came close to the surface, prior to discharging in the coastal strip.

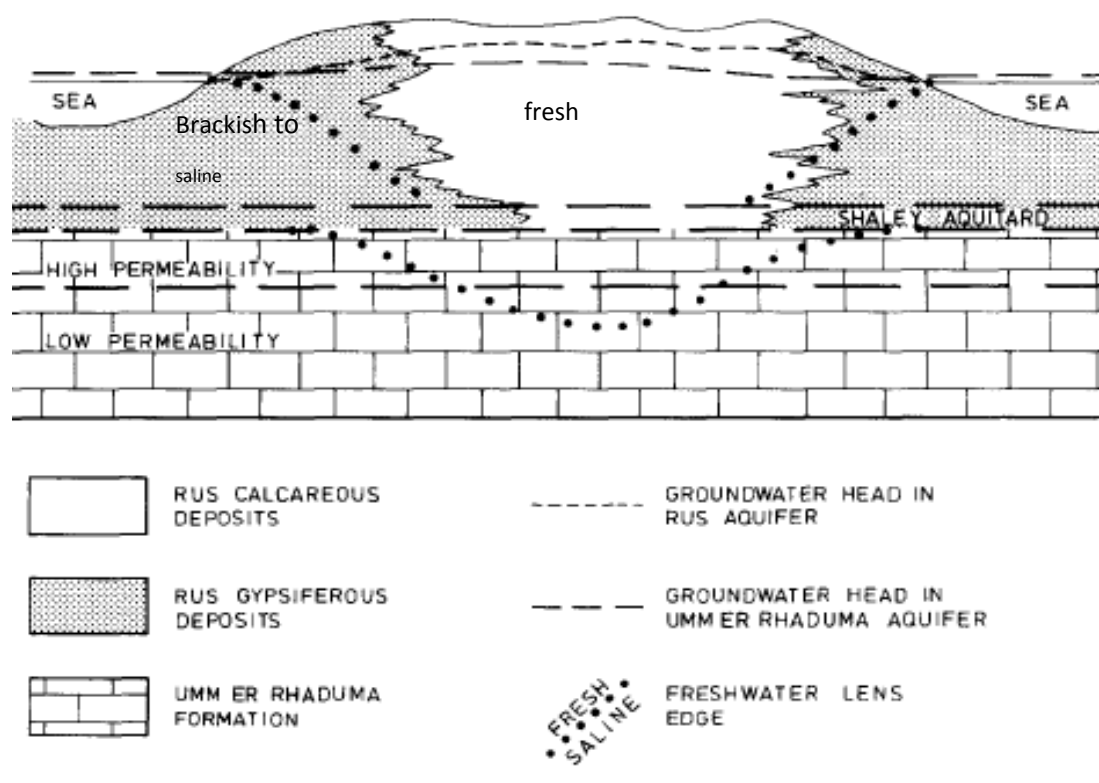
More generally, the area between Al Zubarāh and Al Fuwayrit is one where good quality groundwater, which was which was recharged in the Qatar hinterland in the past, outflows at the coast (Figure 5.37a). The fresh water occurs in the calcareous facies of the Rus Formation as a freshwater lens, overlying and contained within an otherwise brackish to saline regional groundwater system (Figure 5.38).

While its tritium content indicates some modern day groundwater recharge (Figure 5.58), the climate is arid to hyper-arid, and it is likely that the bulk of the water in the lens is fossil water recharged during wetter periods during the early Holocene and especially the last interglacial period (Eemian). That is, whatever recharge occurs in the today's arid setting would only top up the shallow aquifer, but is not the principal water source.

In a 4.5 km radius of the irrigation area south of Al Jumayl near Umm Jassim there were over time, a number of settlements established on the coastal plain, including the early occupation of the Ruwada Fort, and the abandoned towns of Al Jumayl, Al Khuwayr, Al Arish, Furayhah, and the small towns of Al Nabaah and Khidaj (Figure 5.34 and 5.35) now represented as ruins.

Qatar is a relatively low lying country with the highest point only about 103 m above sea level. The coast has been strongly influenced by several marine transgressions which saw sea levels reaching





**Figure 5.38:** Schematic cross section across northern Qatar of the aquifers and the fresh-water lens (from Lloyd et al., 1987)



**Figure 5.39:** The 3 m and 6 m contours, respectively marking the upper limits of the mid-Holocene (3 m) and late Pleistocene (6 m) marine transgressions



**Figure 5.40:** Well in mosque compound at Al Jumayl

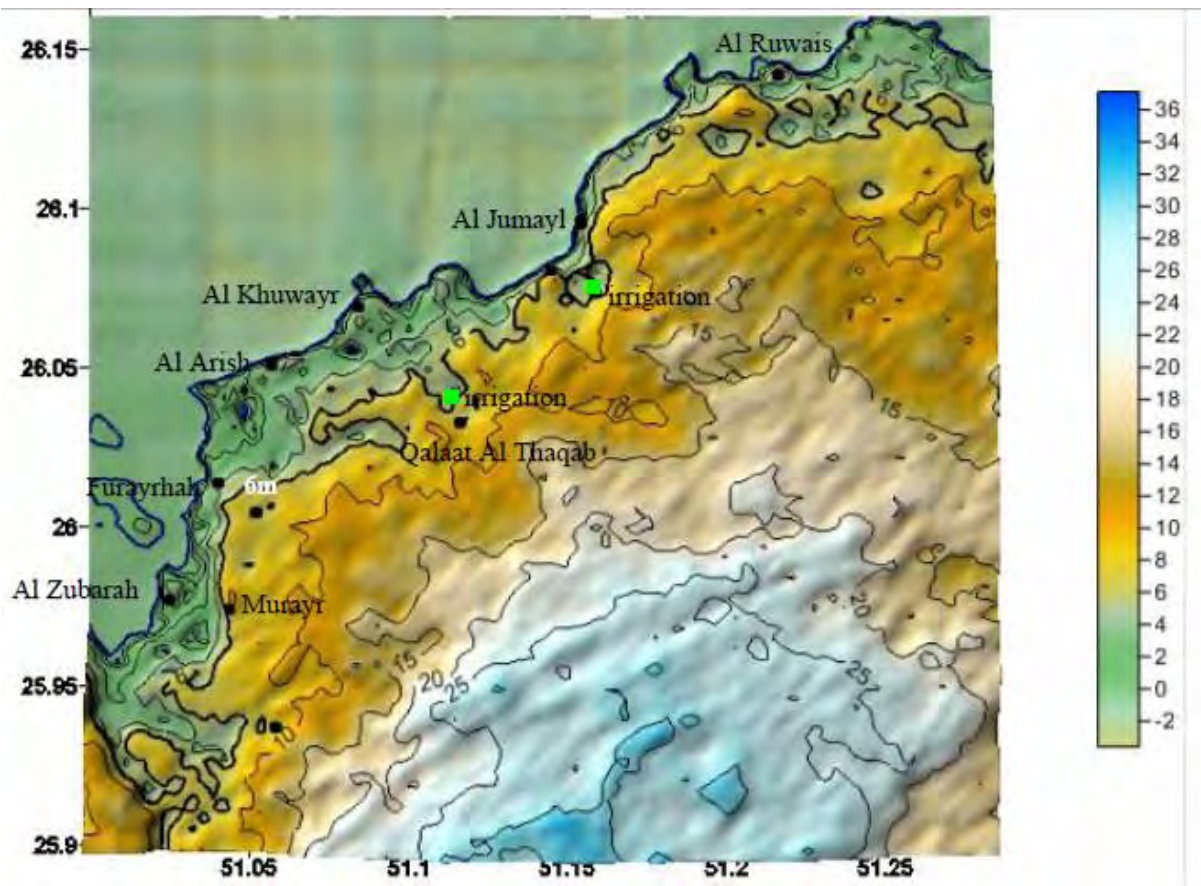


**Figure 5.41:** One of a number of infilled wells south of Al Jumayl



**Figure 5.42:** Al Nabaah ruins located on the coastal plain to west of the Rawdha Fort (locality Figure 3)





**Figure 5.43:** Relief map showing position of the coastal plain at the 6 m contours and its relationship to the irrigation areas between Al Jumayl and Al Khuwayr

heights of 6 m above that of the present some 120-130,000 years ago, and 2-3 m above the present sea level about 4-5,000 years ago. These transgressions have strongly affected the coastal geomorphology of Qatar, the most prominent features being the coastal sabkha, many of which formed following the last regression in mid-late Holocene times, and are hence contained within the 3 m contour. The inland limit of the late Pleistocene marine transgression dating at ca 120-130,000 yr ago is approximately marked by the 6 m contour (Figure 5.39). This contour comes close to the coast near Al Jumayl, but cuts inland along an elongated shallow depression formed by a stream fluve emerging from the higher inland areas, which reaches the coast near the Ruwada Fort. South of the fort, the small abandoned town of Al Nabaah is set back from the coast, also on or about the 6 m contour. In the Jumayl area, the 3 m contour lies close to the coast, but further to the west in the area between Al Khuwayr and Furayhah, the contours pass further inland and contain the active sabkha, such as those between Murayr and Al Zubarāh, between Furayhah and Al Arish and in the vicinity of Al Khuwayr.

The major discharge zone for regional groundwater lies coastward of the 6 m contour. Most groundwater outflows in a varyingly wide zone lying below the 3 m contour covered by active sabkha, where due to high evaporation, salt accumulates leading to hyper-saline groundwater. By contrast, in the Al Jumayl area where the 3 m contour is virtually at the coast the saline outseepage zone is very narrow or even offshore. Back from the coast between the 3 m and 6 m contours, fresh groundwater

occurs at a shallow depth. At Al Jumayl, there are a number of infilled wells located in a walled area to the west of the Shamal Road (Macumber, 2009). There is also a well within the mosque compound, and to the south of the town there are a number of infilled wells (Figure 5.40 and 5.41).

The close proximity of the wells to the coast is explained by the narrow outseepage zone and perhaps by a strong upwards hydraulic gradient in the underlying groundwater system countering seawater intrusion. The wells at the Ruwada Fort and the small abandoned town of Al Nabaah also lie within or close to the 6 m contour (Figure 5.42). Similarly, the wells at Ayn Mohomed and Qala'at Al Thaqab are set back from the coast, beyond the 6 m contour (Figure 5.39). This contrasts markedly with the situation at Al Zubarāh where the wells are set back from the coast on higher ground at Murayr, inland of the sabkha where groundwater discharge is dissipated over a wider very saline area.

### **5.8.2 Irrigation areas supporting the coastal settlements**

Between Al Jumayl and the Ruwada Fort lies a depression extending well to the east of the Shamal Road where there is a large irrigation area (Figure 5.43). To the west of the road the area between the coast and the road lies mostly between the 3 and 6 m contours; it is one with a number of infilled small shallow wells and flat grassy depressions, reflecting the shallow depth to good quality water. The abandoned ruins of Al Nabaah shown in (Figure 5.42) lie close by. Further to the west between Al Khuwayr and Furayhah, the coastal plain widens to between 2 km to 3.5 km, with several irrigation farms near Qala'at Al Thaqab, one active and one abandoned, but both occurring close to the head of a small embayment, clearly marked by the 6 m contour.

It is no coincidence that irrigation should be associated with the embayments, since the 6 m contour marks the approximate inland limit of the last interglacial high sea level; between it and the coast the landscape is formed across flat lying marine sediments. Where wide, there is extensive development of sabkha which are hyper-saline. Landward of the sabkha there are areas where better soils have developed on marine sediments, which are far superior than the poor thin patchy skeletal soils (lithosols) which develop on the adjacent higher areas of Tertiary limestone bedrock. Thicker more fertile soils together with the greater likelihood of concentrated surface run into the depressions (fluves) provide optimum areas for sustainable irrigation in a coastal setting. The groundwater is both shallow and fresh, and as shown below is deflected towards the depressions.

In the irrigation area to the south of Al Jumayl there are a large number of small fields spread across a considerable area (Figure 5.44 and 5.45). A feature of the irrigated area is the large number of shallow wells, which in some instances appears to be virtually one well per field. Although elsewhere masked by trees, it is especially clear in the south-east corner of Figure 5.42 where small dark areas are most commonly infilled shallow wells.

The large number of small wells tapping the shallow water table required only sufficient water for the adjacent field, guaranteeing a broad flat cone of depression with minimal drawdown, thereby avoiding seawater intrusion from the coast. Even if there were a deeper freshwater-saltwater interface this far inland, this approach would only skim the fresh water from above any transition zone that



**Figure 5.44:** Patchwork of fields in irrigated area with trees, southwest of Al Jumayl; note close association of wells with fields at bottom left



**Figure 5.45:** Walled irrigation fields, southwest of Al Jumayl, small well in left foreground





**Figure 5.46:** Irrigation from large pits and trenches at now defunct farm near Qala'at Al Thaqat

ight exist. The overall farm layout in the earlier irrigation settlements, whether intentional or otherwise, guaranteed sustainable agriculture while maintaining the freshwater lens. In this instance, it also guaranteed that at the coast the crucial freshwater lens used by the coastal towns was not affected.

The traditional approach to agriculture from small shallow wells south of Al Jumayl and also seen at the Muhayriqat irrigation area near Halwan, can be contrasted with a more modern approach whereby large yielding pumps were placed on wells coupled with extensive farm layout (Figure 5.46 and 5.47). This was adopted across much of central Qatar during the 1960s onwards often with large diameter bores. Closer to the coast where water tables were shallow, large pits could be used, similar to, but much larger in size (Figure 5.46), than that found at Murayr which supplied water to Al Zubarāh.

However at Murayr, the wells were in many cases walk in, without the mechanical aids provided by modern pumps. The modern use of very large pits/wells in conjunction with high yielding pumps is best seen in the large irrigation farm north of Qala'at Al Thaqab, where wells were little more than shallow trenches cutting the water table (Figure 5.456 and 5.47). There was extensive farm layout and a number of pump houses on the pits indicating the large scale of operation. However, the impact of large scale extraction from such wells, given the proximity of the coast, made it inevitable that groundwater levels would quickly fall causing the ingress of seawater intrusion and resulting in salinization, thus making this approach to irrigation non-viable. By contrast, the irrigation farm to the south alongside Qala'at Al Thaqab is on a much smaller scale and based around bores rather than large open pits. While the groundwater is somewhat brackish, crops are still successfully grown.

Irrigation was not observed on the third large depression commencing south of Al Arish (Figure 5.43). however there were extensive grassy flats with a modern concrete well established towards its northern end near the Shamal-Zubarāh Road (Figure 5.48), and a further well towards the head of the depression. In its more upstream areas, the depression is simply a shallow drainage line activated only during storm periods. Small dams (recharge dams) established across the drainage line are not meant as surface reservoirs, but instead hold water briefly, permitting it to recharge the aquifer during storm events. However it does not seem likely that given the low rainfall, these small recharge dams will have any significant impact, and would not compensate for groundwater loss should large scale irrigation be undertaken. Apart from the larger coastal draining depressions noted above, there are a number of areas of rawdha which occur, as either small isolated wide flats or form tributaries to the larger depressions. Associated with these are ruins and associated small wells such as is shown in Figure 5.49.

### **5.8.3 Non-coastal sites**

Ruins of the town of Shadiraya are located 6 km from the coast at an elevation of 10 m at the head of a semi-connected shallow depression which enters the coastal plain north of Qala'at Al Thaqab (Figure 5.50). As is the case with all early Qatari towns, Shadiraya was clearly dependant on wells, and there is a modern day well present on the flats (Figure 5.51).

In the vicinity of Shadiraya, a drainage line widens to form a broad basin-like plain with the ruins located on the higher ground around the basin rim. The stream pattern is unusual in that it consists of a maze of sinuous channels all linked to the central channel but with the individual side channels commencing/finishing at the valley side (Figure 5.52). Such stream patterns are rare in Qatar, although similar patterns were described from the Loddon Plains of southern Australia as fluvial features in situations where groundwater tables were close to the surface; they were referred to as playettes (Macumber, 1969). The formation of the sinuous drainage pattern at Shadiraya indicates very shallow water tables probably at times within capillary reach of the surface. While considered as being essentially related to surface fluvial processes, the abrupt termination of the streamlets at the edge of the plain is analogous to a spring outflow feature, and it is possible it also represents groundwater outflow from the Tertiary limestone aquifer during times of high groundwater pressures. Whatever the case, it clearly provided a prime hydrologic setting for the original siting of Shadiraya.

The wadi at Shadiraya is incised into the Eocene limestone landscape, and away from it, either laterally or inland, the depth to the water table increases markedly as the landscape rises. To the northeast there are a number of farms, one located 2.5 km northwest of Shadiraya, has an extensive irrigation layout and a high capacity deep dug well (Figure 5.53 and 5.54). However irrigation has been abandoned and this seems likely to have been in part instigated by a fall in groundwater levels probably leading to deterioration in water quality. This has been a characteristic of a number of intensive irrigation undertakings across northern Qatar (Macumber, 2009).

On passing inland away from the coast groundwater levels are deeper and water supplies for farms with irrigation layout are from bores, rather than dug wells. However in a large number of instances where there has been intensive irrigation, the farms have had proved to be not viable and have a similar history leading to abandonment (Amaret, et al., 2008, Macumber, 2009). This was predicted by Eccleston et al., who stated that “groundwater supplies are at present being mined at an accelerating rate and are likely to be exhausted or have a deteriorated to an unacceptable quality within the next two decades”.

### **5.8.3 Relief as a factor in early occupation**

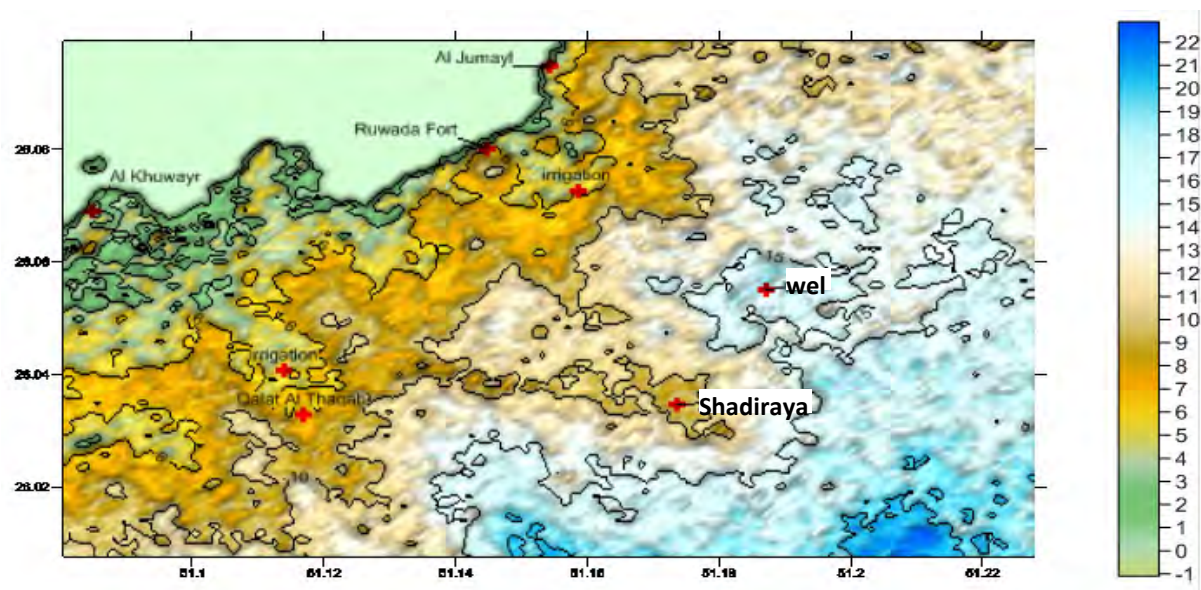
From an archaeological perspective, one of the most important factors in early occupation is the water table configuration which is relatively flat across northern Qatar, rising to only 4 m above sea level in 1980, compared with 13 m in 1958 (Figure 5.55 and 5.56). Yet the landscape across central northern Qatar reaches levels of greater than 40-50 m (Figure 5.56 and 5.57) and the depth to the water level progressively deepens away from the coast.

Furthermore, good quality groundwater is largely restricted to areas within the calcareous zone in the Rus Formation (Figure 5.38). Given that the uppermost geological layer is the dense cryptocrystalline Dammam Formation dolomitic limestone and the water table is at considerable depth, the use of deep dug wells for a water supply in the interior seems problematic in earlier times. However, whether such deep wells did exist in the past is not clear. Yet there are a number of significant rawdha areas in central Qatar, many associated with large depressions (grabens?) located to the east of the Al Gharriyah Fault (Figure 5.57). One such deep depression is shown on the cross section in Figure 5.56,





**Figure 5.47:** Extensive farm layout from farm north of Qala'at Al Thaqab with large pit wells around the perimeter, especially at the bottom



**Figure 5.48:** 3-D topographic map of the coastal plain and hinterland with Shadiraya depression





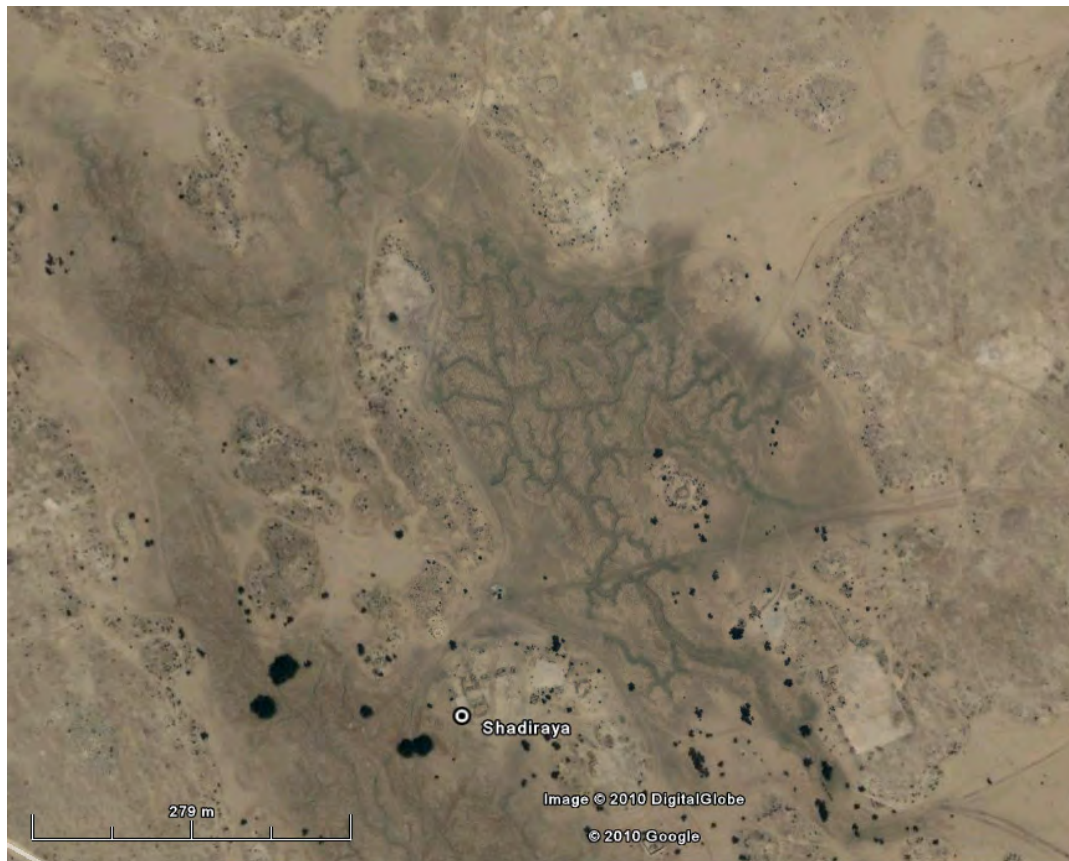
**Figure 5.49:** Well at coastal end of grassy depression lying within 6 m contour



**Figure 5.50** Ruins with associated infilled well on edge of rawdha, to the west of Qala'at Al Thaqab



**Figure 5.51:** Shadiraya ruins with grassed plain and modern well in background (left)



**Figure 5.52:** Drainage pattern at Shadiraya



**Figure 5.53:** Enclosed farms located 2-3 km NE of Shadiraya





**Figure 5.54:** Farm with irrigation layout (left) and deep dug well (right), located top right of farm

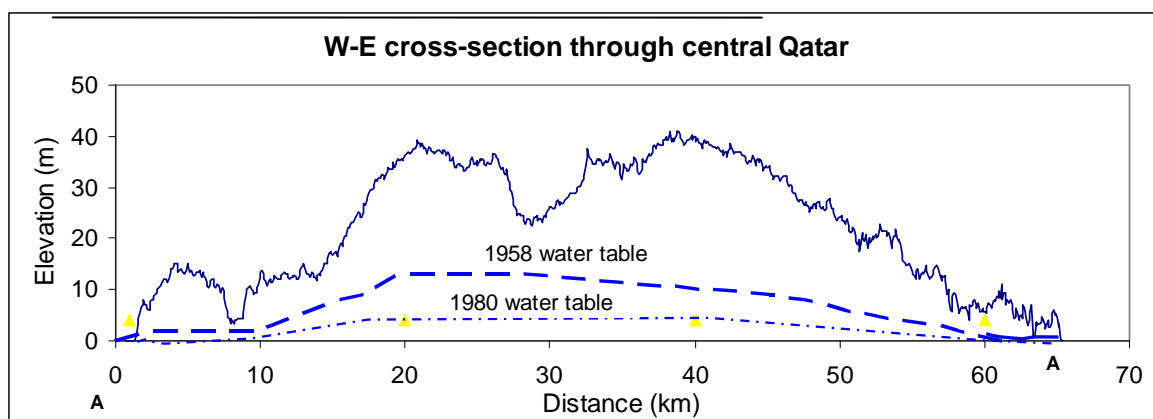
located 30 km from the western coast. Despite there being a number of modern farms and settlements in these areas, presumably with bores, a cursory examination of the depressions did not show evidence of dug wells such as might indicate early occupation. This does not preclude localized shallow perched groundwater systems being present; however given the aridity of Qatar, if such occurrences exist they do not guarantee the permanency of water supply that the regional groundwater systems provide closer to the coast. By contrast, examples of areas of shallow groundwater are found in the region of ‘shallow wells’ (Figure 5.58) mapped by Lloyd et al.. While further investigation of this point is essential, it appears that early settlement of Qatar may be largely confined to the near coastal areas mostly in the north, where a permanent fresh water supply was available. Also clear from Figure 5.56 is the change in groundwater levels induced by extractions between 1958 and 1980. This has resulted in a shrinkage of the freshwater lens, both vertically and at the coast. The latter has led to seawater intrusion into the coastal aquifer resulting in the salinization of coastal wells on which the coastal towns and agriculture previously relied.

## 5.9 Conclusions

Qatar has an arid to hyper-arid climate with low relief and no surface streams. Early settlement was therefore largely dependant on groundwater, with a number of small towns scattered around the northern coast relying on shallow wells. Their presence closely relates to the hydrogeology, wherein fresher water occurs as a lens within the calcareous facies of the Rus Formation aquifer, which is otherwise brackish to saline. The freshwater lens outflows along the northern coast in a strip between Al



**Figure 5.55:** Height of the top of the water table above sea level -1980 (from Lloyd, et al., 1987)



**Figure 5.56:** W-E Topographic cross-section 'A-A' through north-central Qatar with recharge and flow



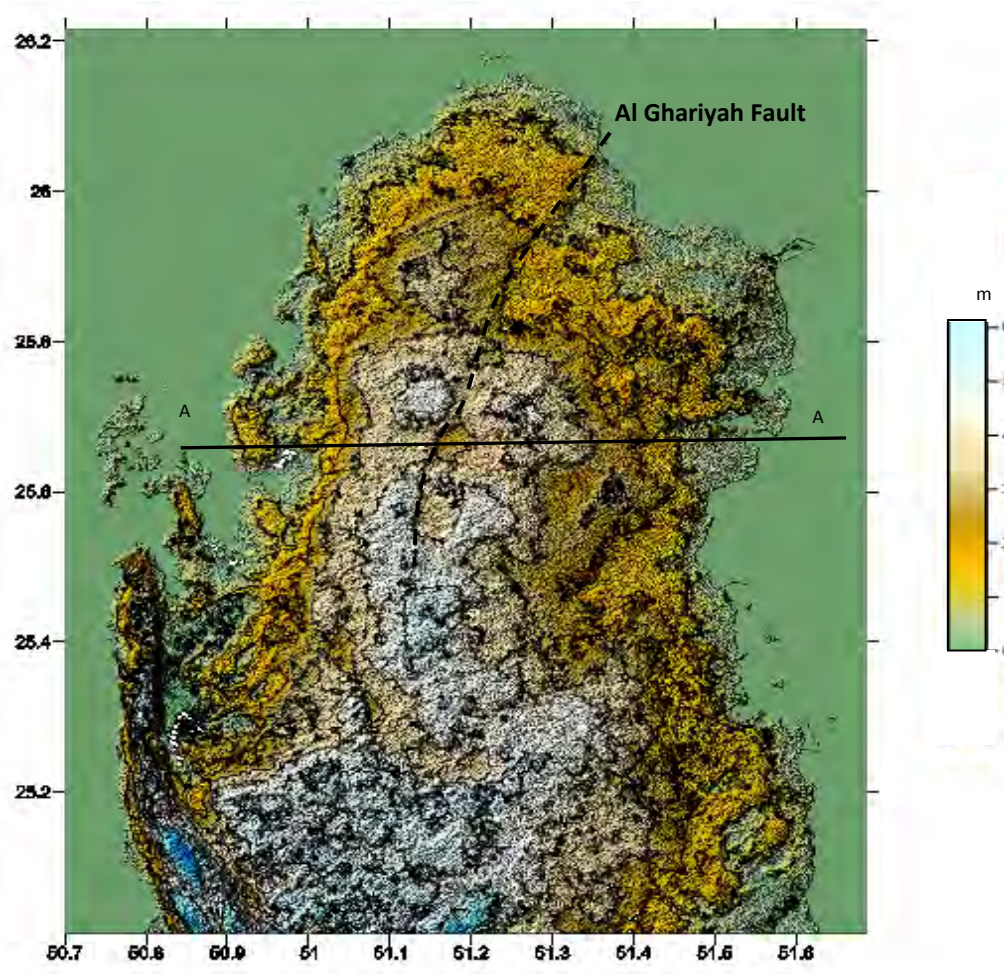


Figure 5.57: Relief map of northern Qatar

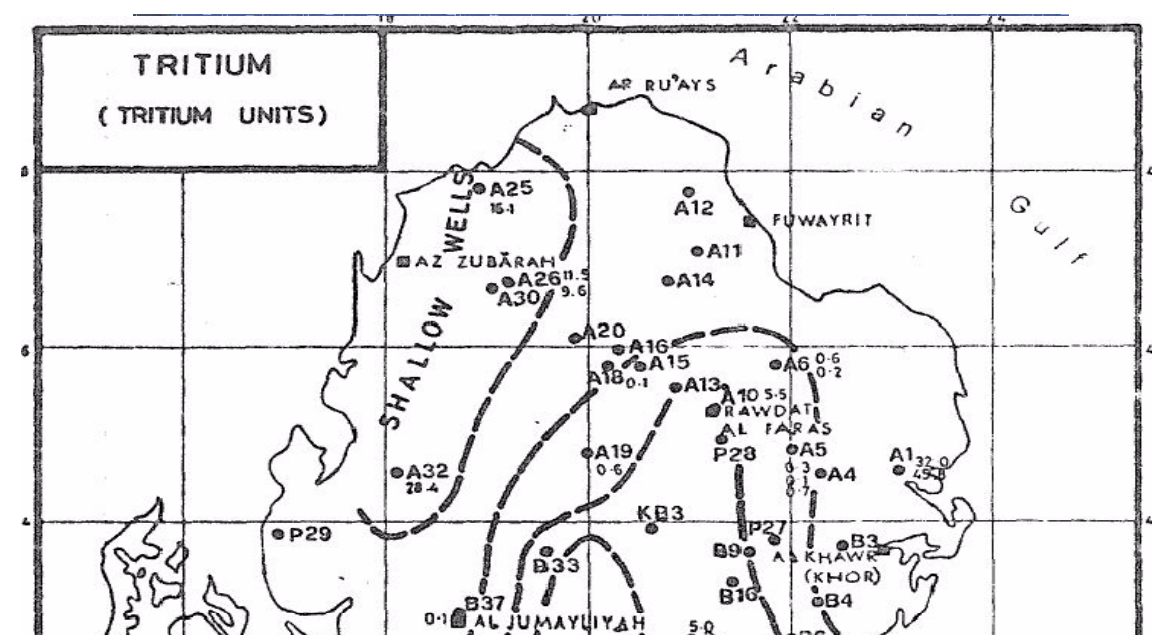


Figure 5.58: Northern Qatar showing zone of shallow wells with high tritium content (from Lloyd et al., 1981)

Zubārāh and Fuwayrit, where early settlement density is the highest in northern Qatar, with greatest concentration in the Al Arish to Al Jumayl area, to the east of Al Zubārāh.

Inland from the coast, the topography rises to 50 m or more above sea level, however the groundwater level which is at sea level at the coast is relatively flat and is only 4 m above sea level in the interior. Given that the uppermost hydrogeological layer consists of dense cryptocrystalline Dammam Formation dolomitic limestone, the water table is at considerable depth, and fresh water is largely restricted to the calcareous zone in the Rus Formation, the use of deep dug wells in the interior in earlier times seems unlikely. Whether deep dug wells did exist in the past is however not clear at this stage, but no hand dug wells were observed on a reconnaissance trip examining large inland depressions lying to the east of the Al Ghariyah Fault.

Qatar has experienced at least two wet phases over the past 130,000 years, both phases corresponding to interglacial periods, the earlier being from 130,000 to 111,000 years BP and the later one being in the early Holocene period from ca 9,000 to 6,000 years BP. The earlier wet phase was the larger event and coincided with interglacial high sea levels and a marine transgression. The early-Holocene wet period only partially overlapped with the early stage of the mid-Holocene high sea level.

The coastal geomorphology is strongly affected by the two interglacial high sea stands, the later one which peaked at about 4,000 yr BP (mid-Holocene) reached levels of 2-3 m above the present sea level. The height of the transgression was dated at Al Zubārāh as being from about 5,800 yr BP until ca 4,000 yr BP. The regression dates from ca 4,000 BP upto ca 1,066 BP. The earlier late Quaternary transgression is dated elsewhere as being from 130-110,00 years ago (Eemian phase, or Sangamonian – U.S.), with sea levels reaching about 6 m above those at present – see also the associated Al Khor report. During the earlier marine transgression sediments were deposited across the coastal area to a height of 6 m, except in the case of derived aeolianite dunes which were somewhat higher. The landscape arising from the earlier transgression, its hydrological impact, and the relationship to later occupation is a major focus of this study.

A legacy of the mid-Holocene transgression and regression are the active coastal sabkha, found all round the Arabian Gulf, where regional groundwater discharges in a hyper-saline setting. Various active palaeo-sabkha are associated with the earlier transgression and are higher in the landscape, being commonly at levels of between 3-6 m above the present sea level. They have at times a strongly indurated gypsite surficial layer, which has been variously converted to anhydrite (see Al Khor report).

In a number of instances shallow depressions or embayments often defined by the 6 m contour pass inland from the coastal plain. While in some cases the larger depressions represent the lower end of shallow drainage lines or fluves, other depressions may have started as coastal springs during wetter periods in the past, and advanced inland by spring-head erosion. The embayments are a focus for storm runoff which recharges the shallow aquifer, and they are an area of convergence for coastward groundwater flow. Because of the shallow fresh groundwater, they provide the optimum physical setting for early near-coastal settlement and offer perhaps the most likely areas for early occupation sites across northern Qatar.

The embayments may also provide a setting for sustainable irrigated agriculture, based around multi-

ple shallow wells. At Umm Jassim, the large number of small shallow wells tapping the shallow water table required only sufficient water for the adjacent fields, guaranteeing minimal drawdown and thus avoiding seawater intrusion from the coast. Even where there is a freshwater-saltwater interface at depth, this approach would be only skimming the fresh water from above any likely transition zone that might exist. The overall farm layout in the irrigation settlement, whether intentional or otherwise, guaranteed sustainable agriculture while maintaining the freshwater lens. It also guaranteed that at the coast the crucial freshwater lens used by the coastal towns was not affected by upbasin groundwater extractions, while providing an important agricultural input and perhaps water supply back up for the towns.

## 6. Excavations in Al Zubārah

### 6.1 ZUEP01

*Richard Humphrey*

#### 6.1.1 Introduction

Excavations at Zubārah Excavation Point 1 (hereafter ZUEP01) were designed to elucidate upon the findings of the Stage 1 investigations conducted between January and May 2009. Previous excavations had uncovered several phases of urban occupation of the harbour side settlement of Zubārah and relate to the material remains of a domestic occupation compound, a tower and an associated city wall. In 2009 three archaeological phases were identified in ZUEP01 including a main architectural phase, a phase of tower and inner town wall construction, and a phase of recent occupation. The Stage 2 investigations in 2009-2010 evaluated this tri-partite sub-division and added further phases and more detail to our understanding of this area inside Al Zubārah.

Last season's ZUEP01 excavation area measured 40.00m by 40.00m square with the southwest corner located at Qatar National Grid (QNG) 0960E/9240N. This area was expanded 10m to the north to explore an adjacent structure. Investigation of the compound, city-wall and tower structure dominated the first seasons work with little investigation occurring in the southwest of the area. The ZUEP01 area covered in this report measured 60m from north to south and 45m from east to west, again commencing from the south-west grid point of QNG 0960E/9240N (Figure 6.1.1, 6.1.2 and 6.1.3).

#### 6.1.2 Natural Deposits

Archaeologically sterile and culturally unmodified loosely compacted yellow sand were identified as a potential candidate for naturally occurring sands. The position of these sands at the very bottom of the archaeological sequence are sediments on which the settlement appears to have been first established. Zubārah. These overlie bedrock and represent sediments that accumulated following the mid-Holocene marine transgression (see Macumber 2009, and Section 5 of this report). It is possible that previous occupations may be contained beneath the sandy sediments found in ZUEP01, but given their height just above sea level this seems unlikely.

The underlying, natural stratigraphy was observed in the following locations:

A large storage pit, [1425], positioned within the alleyway between the central and northern compounds (Spaces 123 and 118) was first identified as being a bell-shaped cut feature (Figure 6.1.4). This was later thought to be unlikely and the expansion of the pit once the cut had passed through laminated occupational horizons was a result of undermining loosely consolidated natural sands.

The 'tannūr room' (Space 110) within the central compound saw complex intercutting incisions for ceramic cooking installations made through accumulated occupational horizons. Several of these incisions were observed to extend beneath the floor surfaces of the building into loosely compacted

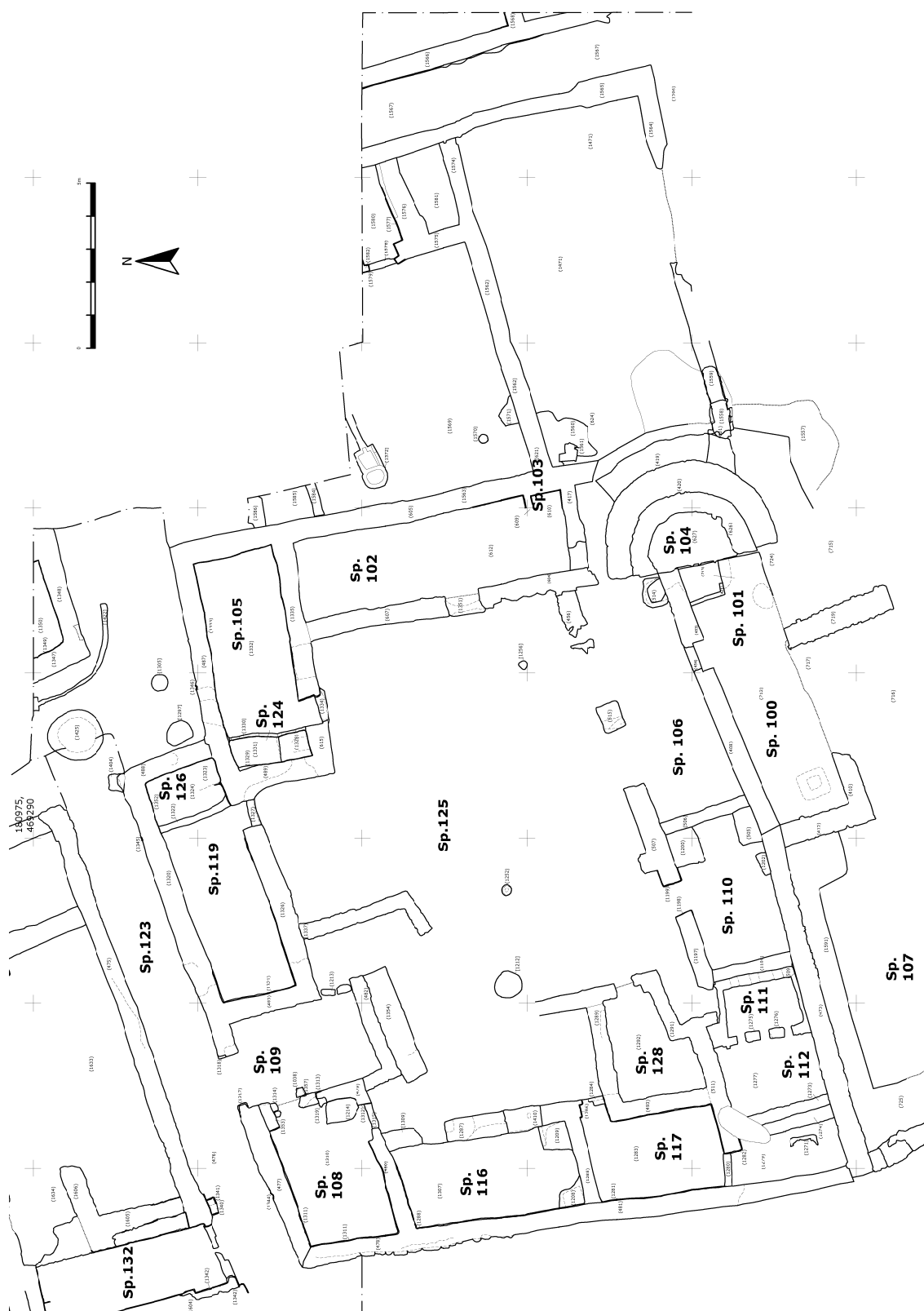
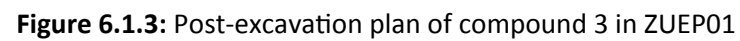


Figure 6.1.1: Post-excavation plan of compound 1 in ZUEP01



**Figure 6.1.2:** Post-excavation plan of Compound 2 in ZUEP01





**Figure 6.1.4:** Cut of a storage pit or cistern [1425] exposed the natural stratigraphy underlying ZUE-



**Figure 6.1.5:** Overview of Compound 1 in ZUEP01 looking southeast, showing the fully excavated rooms within Phase 3

sand. In both of these instances, the clean sand horizon was observed to be unlaminated, suggesting it not to be a windblown horizon.

Space 143 in the south-western compound building was seen to have a large cut, [1459], made through its floor surfaces into clean, loose yellow sand. Beneath the base of the construction phase of the walls and the occupation horizons of the space, similar loosely compacted yellow sand, [1663], was visible, similar to the sediment described above.

### **6.1.3 Phase 6: Temporary Occupations**

An east facing section created as a result of a large pit, [1459], having been dug through the floor surfaces of Space 143 revealed what appeared to be cuts and fills made through beach sand [1663]. These were recorded as a *tannūr* [1667] and cuts [1668] and [1669]. The remnants of a *tannūr* were also seen beneath the walls of the later structure. These were not fully excavated as they were not in the correct stratigraphic phase. Therefore, the extent and nature of these features could not be fully understood, and dating evidence could not be collected.

The sharp break of slope, sloping edges, rounded base and differential fill of several unrecorded features seen in section might tentatively be interpreted as cuts relating to either post-holes or shallow occupation related pits. If the former, then these might well represent the remnants of tent posts, animal tethers or fence posts that required the piling of a post type feature. Indeed, the darker soil observed to fill the cut features might well represent decayed timber. The latter possibility of domestic-waste disposal pits might also produce a darker stain to the fill of the feature, again from decayed organic matter.

A similar collection of early features (post-holes, refuse pits, isolated *tannūrs* and occupation surfaces) were also recorded in ZUEP03 (see Section 6.3), which may represent contemporary or analogous camp occupations.

The level of exposure of these features in this season does not allow for a full interpretation at this point. They could represent evidence for tent camps, palm leaf/ matt huts, or another form of early occupation. For the time being, their apparent position within the archaeological sequence shows that there was a phase of settlement prior to the construction of the substantial architecture of Phase 5.

### **6.1.4 Phase 5: Main Construction and Occupation Phase of Compounds**

Last season's works identified a compound consisting of a central courtyard area encircled by rooms (see Bille 2009; hereafter referred to as Compound 1). Excavation of this structure to sufficient depth to assign functionality to its rooms from occupational layers was a primary research aim of this season's excavation (Figure 6.1.1 and 6.1.5).

Expansion of the ZUEP01 area approximately half way through this season resulted in the discovery of further compound structures to the north (hereafter Compound 2, Figures 6.2 and 6.1.6) and south (hereafter Compound 3, Figure 6.1.3 and 6.1.7) sharing a comparable spatial arrangement to Compound 1. Walls extending from the eastern external wall of Compound 1 suggested outbuildings that





**Figure 6.1.6:** Compound 2 in the northern part of ZUEP01 following removal of overburden. By the end of the 2009-2010 season rooms were not fully excavated, awaiting further investigation in the 2010-2011 season.



**Figure 6.1.7:** Compound 3 in the southern part of ZUEP01. Only part of this compound was exposed, its continuation lying outside the excavation area to the south and west.





**Figure 6.1.8:** Space 123 looking east — east-west running alleyway between Compounds 1 and 2.



**Figure 6.1.9:** Space 132 was the only room excavated to floor level in Compound 2 and represents an entrance hall to the courtyard house.

may have been part of the original layout. At this point, it is uncertain whether these relate to domestic occupation or whether they were used for animal sheltering or storage.

An alleyway (Space 123, Figure 6.1.8) that marked the northern extent of Compound 1 is thought to have been part of a planned grid network consisting of east to west aligned thoroughfares that would may connected the settlement with the harbour front. In this instance, it also represented the division between Compound 1 and Compound 2. Excavation Compound 2 was limited to identifying the arrangement of walls and the uppermost removal of sandy-rubble backfill that filled the rooms. No occupational horizons were reached, except in Space 132, which represents an entrance room or hall (Figure 6.1.9). From this room a wide doorway gives access to the alleyway (Space 123; see discussion below).

Investigation of the ZUEP01 area in the southwest revealed the northeast corner of Compound 3. Like the other two compounds, this consisted of parallel walls arranged at right angles and with evidence of discrete rooms positioned around a central courtyard. Unlike the other two units to the north whose walls were aligned on a north-north-west to south-south-east alignment, this was built at an angle aligned more on a northwest to southeast axis. The differential alignment and robbing of building material seem to suggest that this building was built at an earlier time than the other two although it was still in use as the same time as the others (see Section 6.1.5 below).

Attempts to locate the remains of the later city wall in the expansion of the ZUEP01 area to the southeast failed, most likely as a result of the feature having been removed as part of the systematic robbing of stone. However, this area did briefly reveal the masonry and occupational-surface remains of what has been interpreted as buildings of a comparable date to the three compounds seen to the north and west.

### ***Early Compound in SW of ZUEP01 area (Compound 3)***

The removal of several later phases of rubble from collapsed walls, as well as windblown sand accumulations and robber cuts, revealed the remains of a compound in the south-west of the excavation area. The walls of this structure were aligned on a north-west to south-east axis and markedly different from the alignment of the other compound walls.

These remains represent the north-eastern corner of a compound structure that, like Compounds 1 & 2, is based around a central courtyard space. Although the limits of excavation of ZUEP01 did not allow exposure of the entire structure in plan, this building plan appears to be ubiquitous in Zubārah and the arrangement of the rooms of Compound 3, suggest very strongly that this structure has a very similar layout. Space 143 represented a room in the north-east of the building and measured approximately 5.50m long by 2.40m wide, bounded by walls <1593> and <1594>. Floor surfaces in this room were truncated by a large cut, [1459], perhaps intended to rob material from the floors after abandonment, which had left a good section showing laminations of occupation horizons (Figure 6.1.10). Robber trenches indicate attempts at robbing the masonry of this wall following its abandonment.

To the south of this room, Space 141 was of similar dimensions as Space 143 although without the large robber cut and compacted floor surfaces. Instead, a loosely compacted shell surface, (1436), is proposed to represent a bedding horizon, similar to those seen elsewhere Zubārah. Wall <1593>





**Figure 6.1.10:** Space 143 in Compound 3, showing truncation of floor surfaces by cut [1459]

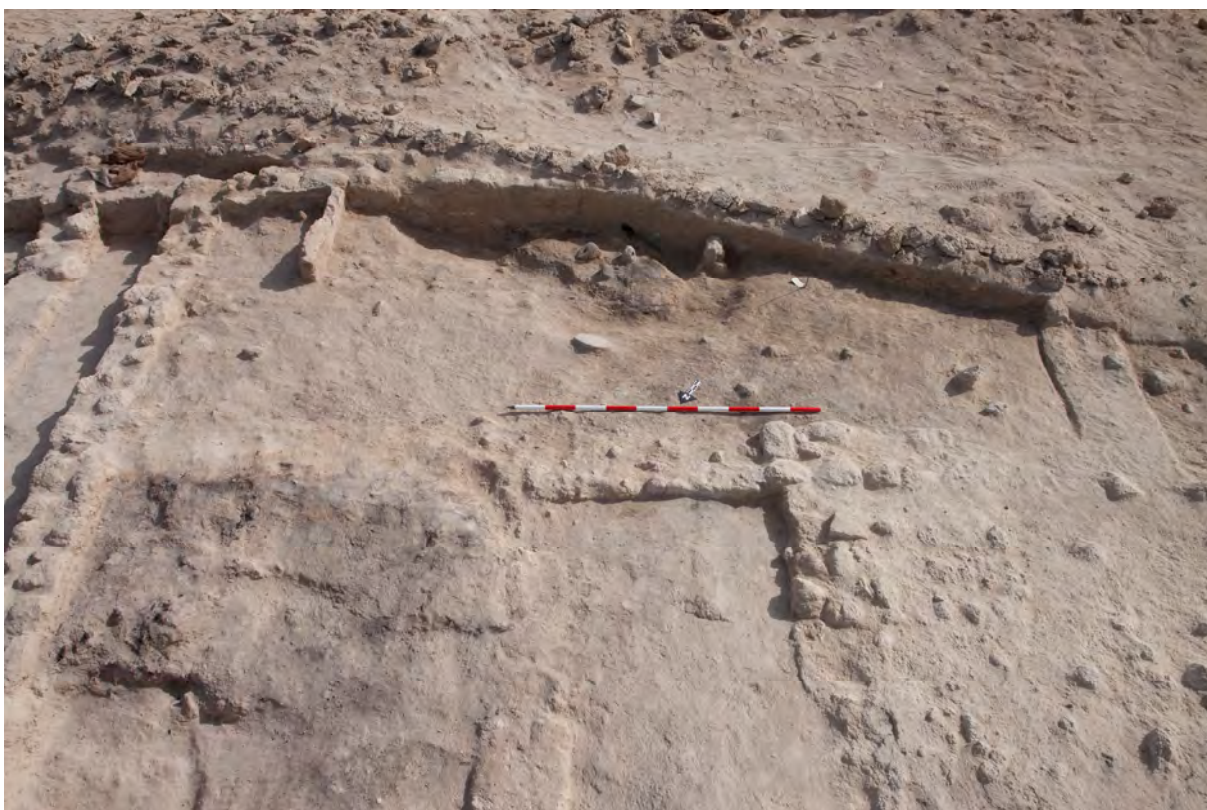


**Figure 6.1.11:** Space 152 to the east of Compound 3, looking north.





**Figure 6.1.12:** *Madabes* <1599> in Compound 3.



**Figure 6.1.13:** Space 140 in Compound 3 showing diver's weights *in situ* and ablution feature <1603> in the top left corner of the room.

formed the northern boundary of this space with <1590> to the east and <1514> to the south. There was an open entranceway into Space 137 to the west.

Leading south from Space 141 was a narrow corridor, Space 152 (Figure 6.1.11). This was bound by wall <1589> on the east side and wall <1600> on the west side. This space measured approximately 9m long by 1m wide. The narrow width of this corridor was quite surprising considering the width of other similar features seen elsewhere. The possibility of one of the side walls belonging to another phase of construction was disproved by floor surface <1478> in the space sealing both walls, suggesting the same phase of construction. Wall <1600> did not extend as far south as the parallel <1589>. It is proposed that at one point, the corridor would have formed an open connection with space 150 to the west. A later phase of blocking, observed as masonry <1653> followed the course of wall <1600>, continuing the corridor to the south and forming a barrier between the two spaces.

Immediately adjacent to the courtyard of this compound, Space 139 represented a room defined by the walls <1598>, <1596>, <1600> and <1587>. Within the north of this space was a plaster-moulded date press, <1599>. This survived in good condition with only the western side partially truncated (Figure 6.1.12). The presence of this feature within the compound is significant as it suggests date-pressing was not an activity restricted to a specific zone in the settlement, but was rather a more domestic activity practiced by extended families or groups, within their own home. Similar examples were recorded in ZUEP02 and ZUEP04 this season (see Sections 6.2 and 6.4 below), as well as in the previous QMA excavations.

The southern half of Space 139 was dominated by a burnt and collapsed roof (1426) overlying truncated floor surfaces (1692) and (1693). Although predominantly charcoal, ash and burnt ceramic, this had the appearance of being composed of twigs, and sticks that had been weaved together then strengthened by the application of a plaster or render. A threshold was present on the western side of wall <1598> allowing access to this room.

The supposed courtyard of this compound extended beyond the western limit of excavation of the trench, although wall <1595> extending east to west across the north of the area appears to represent a northern boundary. This appears to be a later addition to the rest of the structure as it abutts wall <1594>. Multiple laminations of burnt material and windblown sand (1682/1686/1688) as well as cut features such as pits and *tannūrs* [1689]/[1690] were seen within this area. These were not fully excavated due to time constraints.

Although not fully exposed, the southern area of Compound 3, as it appeared in the extended ZUEP01, area was composed of two rooms on the southern side of the courtyard. Only a small amount of fill and occupation surfaces of the western of these rooms was investigated due to spatial constraints. The eastern room (Space 140) was examined in greater depth. Before overburden and wall collapse were removed, a plaster lined hammam or ablution type feature, <1603>, was seen protruding and visible on the surface. This room shared many of the characteristics of rooms examined in greater depth in Compound 1. Perhaps most significantly, evidence of burning and wall/roof collapse from a catastrophic event was documented as deposit (1431). This material formed the fill of a large episode of disturbance of the floor layers of the room, visible in sections. Following an apparent destructive, burning event, it appears that inhabitants may have returned to salvage possessions from the building. This is supported by the retrieval of several diving-weights from the room, found on the highest surviving floor levels, representing the last phase of occupation before the collapse occurred (Figure





**Figure 6.1.14:** Detail of diver's weights *in situ* in Space 140 within burnt roof collapse.



**Figure 6.1.15:** Entrance 'hall' (Space 109) to Compound 1 from alleyway Space 123.





**Figure 6.1.16:** Fragment of decorated door lintel fallen in the doorway between Space 108 and 109.



**Figure 6.1.17:** Example of plastered ablation feature/ basin in Space 125



**Figure 6.1.18:** Example of plastered ablation feature/ basin in Space 124

6.1.14). Multiple phases of floor resurfacing were evident from the visible sections (i.e. [1508], [1515], [1516], [1522]) that amongst other things illustrated the alternating laminations of plaster floor and bedding material. Also visible were several *tannūr* ovens cut into these floors, recorded as [1520] and [1521]. Threshold <1602> would have been used to gain access to the room from the courtyard area

As mentioned, significant robbing of stone occurred on the north-eastern side of the compound. A north-west to south-east aligned wall, <1591>, that joined the corner of Compound 3 with the south-western corner of Compound 1 was partially robbed out. This is thought to be a later addition of this building and designed to block off the area to the east, perhaps as it was in use as animal sheltering or simply an open space- no other significant architectural remains were seen in this area, suggesting they were either robbed or that it was an open space.

### ***Central Compound (Compound 1)***

Investigation of the Compound 1 followed a systematic approach of defining the walls identified during Stage 1 followed by sequential excavation of the rooms to ascertain their function. Complete excavation of room fills and masonry to natural horizons was not undertaken to retain the fabric of the structure for future presentation. Archaeologically sealed and stratigraphically dateable occupation surfaces were investigated to a depth where they reached the base of the walls that sealed them.

Several possibilities exist for access points into Compound 1: a large doorway between Space 123 (the alleyway at the north) and Space 109 likely represents the main entrance. This has a formal character featuring a wide doorway, threshold and large entrance hall. The important consideration of controlling visitors line of sight and what is visible to them when entering a structure would have been possible here with right-angled walls (<482> and <1337>) preventing the central courtyard being immediately visible. Also, Space 108 to the west may have served as a 'waiting-room' where the flow of guests and visitors could be controlled. Here a decorated door lintel fragment was found collapsed into the former doorway (Figure 6.1.16). Other thresholds on the south-western, eastern and south-eastern sides may well have also been used although truncation to these sides and the unknown complete extent of the compound in these directions makes it unclear whether these were external access points or whether they merely gave access to adjoining rooms or outbuildings.

Overall, the compound remains exposed measured approximately 18.00m from north to south and 23.00m from east to west with the central courtyard of the structure measuring approximately 14.00m east to west by 11.00m north to south. Space 121 in the very south-west corner may have been used as part of an entranceway specific area to gain access to the structure. It was bounded by wall <481> to the west, wall <408>, to the east by <1274> and by <511> to the north. A threshold <1280> allowed for access into the next Space to the north, 117. This too was bounded by <481> to the west. On the eastern side was <493> and the northern side was <1285>. Access to the central courtyard was possible by crossing threshold <1284> although it appears that line of sight was an important consideration here too with wall <1290> (the northern turn of wall <1289>) blocking an immediate view of the area. To the east of 117, Space 128 formed a room only accessible from the courtyard. It was bounded by wall <1289> to the north, <493> to the west and <511>/<1291> to the south. Although its function within the compound is uncertain, its proximity to the baking area of

Space 110 and fish-processing area of Space 111/112 might not have made it a comfortable living area.

Space 116 was to the north of Space 117. A plaster lined wash basin <1209> and several unexcavated *tannūrs* ([1406] and [1407]) in this room suggest living quarters of the compound's inhabitants. The room was bound by wall <481>/ <478> on the west side, <1285> to the south, <1287> to the east and <480> to the north. A plaster lining was seen as <1288> around the room. Access to the room was initially thought to be through a break in wall <1287> at the north but careful examination actually showed a socketed-doorway, later recorded as feature <1410> to the south. This would have led into the courtyard, but again, line of sight seems to have been a consideration here. Proximity to Space 108 to the north may be significant in establishing a possible importance of the habitation rooms of the compound. Space 108 was accessed from Space 109 by threshold <1359> to the east and an unnumbered threshold to the south. A limestone bench feature in the southeast corner of the room is unlikely to be a hammam or ablution-block type feature as seen in other rooms and instead may have been for decoration as a plinth or work surface. This room was plaster lined by <1311> and as mentioned is suggested to have been an important room for controlling the access of people into the courtyard. The threshold <1357> would appear to have held a door as suggested by possible door sockets.

If the main access point into the compound was through the threshold between Space 123 and 109, it means that the latter is of crucial importance to controlling the path that people would have taken into the compound. Once this entranceway had been crossed it appears that two options were available to enter the central courtyard. People familiar or the occupants of the compound may have accessed the courtyard by walking south through the space, turning to the east and then to the south again. Line of sight seems critically important in this space as the many right angles created by the encircling walls prevent immediate access to the courtyard. This is a common concern in the traditional architecture in Arab houses. The north of the space is bound by the southern walls of the alleyway (<477> and <1320>) with <479> on the west and <482> on the south. The eastern wall is <483>. Wall <1337> extends to the south from the eastern turn of <483>, which becomes <1326>. Wall <1354> to the south of <482> is from an earlier phase of construction- it was made from limestone and <482> is obviously built up against it. This masonry implies multiple phases of building of the compound.

Rooms 119 and 105 in the northeast corner of the compound both appear to be habitation areas where people probably would have lived and slept. The former was bound by wall <483> to the west, wall <1320> to the north, wall <488> to the east and <1326> to the south. Space 105 was surrounded by walls <489>, <487>, <1335>, <615> and <605>. Both had substantial *hammam* or basin-structures at the ends of the rooms (Figure 6.1.17 and 6.1.18). Later excavation in Space 118 to the north uncovered pit [1297]. A hole in the wall led from the basin in Space 126 to this, suggesting that it was a sink hole for waste water. Space 124 in 105 was composed of a double *hammam*-type feature made from <1331> and <1328> and separated from the rest of the space by plaster wall <1330>. This represented a more substantial wash area and may indicate status of the inhabitants of this space. Both rooms were plaster lined and both thresholds (<1327> and <1334>) led directly to the central courtyard.

Space 102 on the eastern side of the compound received considerable attention last season after the discovery of a dhow etching on the north wall <615> of the room. Conservation and replica-





**Figure 6.1.19:** Space 110 under excavation.



**Figure 6.1.20:** Detail of partially exposed storage jar in Space 110.





**Figure 6.1.21:** Excavated tabun in Space 110.



**Figure 6.1.22:** View of Space 110 post-excitation showing multiple intercutting tannūr and tabūn features.

tion attempts of this are detailed in section 10. Little work bar the removal of backfill was done in this room this season. The room was plastered on all its internal faces with access to the courtyard of the compound via threshold <1351>. Several *hammam* blocks recorded last season as Space 103 were again uncovered. One of these had a pattern printed into its north-facing plaster surround. The outflow channel of this feature was discovered to lead to a capped pit observed in the extension of the ZUEP01 area to the east of the tower.

Space 110 was perhaps the most intensively used space of the whole compound (Figure 6.1.19). This is what has been informally referred to as the ‘*tannūr*-room’ owing to its intensive use as a cooking area. Over 20 ovens were excavated and recorded in this room, including the clay lined *tannūrs*, *tabūns* with flues and unlined fire pits. A blocked up threshold in the south-eastern corner of the room marked a subtle change in alignment in the southern wall of the compound, <408>, again suggesting multiple construction phases. To the west of Space 110, burnt masonry stacks recorded as feature <509> in the previous season and <1275> and <1276> in this one, were recorded in Space 111 and 112. Some later blocking between these and Space 110 was seen as masonry <1100>. The function of these masonry stacks was somewhat uncertain with a suggestion that they may have been used for fish-smoking in the room or for controlling the flow of air to Space 110, an important consideration in baking.

If the south-western side of the compound appeared to be used for domestic activities, such as baking or fish processing, then the west, northern and eastern sides may well have been for habitation. As mentioned, the threshold between Space 123 and 109 may have been the main access to the compound. Within the southeast corner of space 116, a plaster lined *hammam* or ablution feature was seen, <1209>. This was not unique to this room, with others present in Space 126 to the east, Space 124 to the east, and Spaces 101 and 103 close to the tower. All of these spaces contained domestic occupation layers filled with pottery fragments and animal bone, as well as waste pits and occasionally *tannūrs* for use in cooking on a smaller scale seen to that in Space 110. It seems likely that these rooms were the private quarters of the compound’s inhabitants, probably where the close family lived.

Running parallel to <604> and <607>, wall <1563> was the eastern wall of the compound, recorded last season as <605>. This extended as far north as the corner of space 105 where it turned to the west, becoming <487>. The southern extent of the wall is uncertain as it continues beneath the later tower although it seems likely that it would have turned to the west at this end too, joining with <408> towards the southeast corner of Space 106. To the east of this wall was a previously unexplored area of the site and one of the research objectives from last season was to ascertain whether the compound or contemporary structures continued in this direction. This certainly would seem the case from the masonry remains discovered. Wall <1562> represented a easterly turn of <1563> at right angles to the latter. Parallel with this approximately 4.50m to the south was a corresponding parallel wall <1559>. Both of these walls were aligned on an approximate south-west to north-east alignment and appear to be a continuation of the same layout as that seen in the central courtyard.

North of wall <1562> several phases of demolition rubble and windblown sand were removed to reveal an interface layer between the overburden and occupation horizons (Figure 6.1.23). A similar windblown deposit of sand was recorded beneath the inner city wall in ZUEP03, post-dating a series of camp occupation horizons (Section 6.3). If these two deposits were linked, it may suggest a pattern

of site-wide abandonment during which the settlement was left to decay. This Space was labelled as 144 and filled predominantly by locus (1569). Burnt floor (1571) is suggested to be an indicator of the destruction of Zubārah that occurred in 1811 (for discussion see Section 3 and below). Next to it was a *tannūr*, [1570], suggesting that this height represents a phase of occupation in this space. A plaster-rendered stone basin consisting of a circular bowl with a sub-rectangular trough attached to the eastern side and an outflow pipe was also observed in this space. This feature was unique across the site and its exact function is unknown. Contrary to the current interpretation, this might suggest human habitation of this space. A short wall, recorded as <1584>, was seen in a small sondage to the north of feature [1572]. This is suggested to represent an internal division as it lacks the width of other supposed exterior walls. It seems more likely that the masonry <1586>, which was more substantial and appeared to be keyed into wall <1563>, does in fact represent the northern boundary of the room.

Further to the east of Space 144, two small rooms recorded as Spaces 159 and 160 were unusual in that they both measured less than 3m<sup>2</sup>. Occupation layers in these rooms were not exposed with layers (1580) and (1581) representing layers of overburden interfacing with floor layers. Only Space 159 had an immediately obvious entranceway allowing for access to the room, recorded as threshold <1578>. It seems these rooms would have been too small for human habitation and considering their proposed position outside of the main central compound gives rise to the suggestion they and Space 144 may have been used for goods storage or animal corralling.

South of wall <1562>, Space 145 was filled at the western end by collapsed masonry from the tower and walls (Figure 6.1.24). It measured a comparable size to that of Space 144 to the north, being approximately 13.00m east to west by 5.00m north to south. The south of the area was formed by the west-south-west to east-north-east wall <1559>. This was made from limestone blocks and only partially exposed although it is suggested that this represents the easterly continuation of a southern wall Compound 1. A break in this wall may derive from the robbing of stone or was intended as an entrance. Upon removal of the presumed rubble collapse from the tower, the burnt interface layer (1471) was exposed. This represented a mixed horizon of overburden and burnt material that sealed the floor surfaces of the room. Towards the tower, this was seen to be composed of much darker, ashier material. As in Space 144 to the north that this may relate to the side wide razing of the settlement in 1811. Further investigation into this layer will hopefully yield solid dating evidence for the episode of burning.

Rubble (1560) was seen within the north-west corner of Space 145 and is supposed to represent remnants of collapsed masonry that lined a pit, of which (1561) is the disturbed capping stone. Loose spoil appears to have fallen into a void below this stone and it is suggested that like pit cut [1297] in Space 118, this represented a corresponding pit from the *hammam*/ablution feature in Space 103.

The continuation of wall <1559> to the east on the southern side of Space 145 was recorded as <1564>. This appeared as a shadow of limestone masonry and needs further investigation. It turned 90 degrees to the north, forming the south-eastern corner of the room that, unlike Space 144, did not contain two smaller space divisions. The turn to the north was recorded as <1565> and consists of several courses of limestone wall forming the western side of Space 169. A corresponding wall approximately 1.50m to the east was recorded as <1566>. Unlike other long, narrow spaces seen within the compounds, there were no apparent east to west divisions here, suggesting it may represent an-





**Figure 6.1.23:** Overview of Spaces 144, 145, 159 & 160 in the eastern part of ZUEP01.



**Figure 6.1.24:** Rubble collapse from tower and wall in Space 145, mixed with burnt deposit.





**Figure 6.1.25:** Overlooking the southeastern part of ZUEP01 facing southeast. Visible are several remnant remains of walls belonging to different phases.



**Figure 6.1.26:** Collapsed arch in the entrance hall to Compound 2.



other part of the alleyway network across the site. The inside eastern face of the space was rendered and several shell and burnt material horizons removed, of which <1567> was the last remaining. Wall <1568> was seen extending to the north-east from the eastern side of wall <1566> and the two appeared to be keyed into one another. The same cannot be said for the masonry of the smaller rooms 159 and 160 at the eastern end of Space 144 - these appeared to be later additions abutting wall <1565>.

### *South-eastern Structures*

This corner of the site represents the least fully explored part of the ZUEP01 expanded excavation area (Figures 6.1.25). It was subdivided into an area measuring 15m east to west by 20m north to south. Two parallel limestone walls <1544> and <1545> were seen extending from the northwest of the area, heading towards the south-east. Only the tops of these walls were recorded so detailed observations as to the phasing and construction characteristics is unavailable. These walls were spaced approximately 2m apart and appeared to be contemporary. Although a definitive occupation surface was not observed, the lowest horizon recorded in this season's works almost certainly represents an interface between occupation and subsequent demolition and abandonment. This was recorded as a dark, ash rich layer, <1546>, <1547> and <1549>, and suggestive of burning across the area, with the top of at least one *tannūr* protruding, [1548]. Again, this may relate to other instances of burning found elsewhere in Zubārah.

Although western wall <1544> was not observed as continuing to the south, wall <1529> was seen as the extension of wall <1545>. This was of a similar build type, although once again, not enough depth was achieved to describe its construction definitively. This wall was also observed to contain patches of ashy fill on its western side that is proposed to represent the interface between overburden and occupation horizons, (1538). At its southern end this wall turned ninety-degrees to the southwest forming the south-eastern corner of a structure. Wall <1541> represents another wall at ninety-degrees to <1529> but this time on the north-eastern side. Walls <1529> and <1541> were not keyed into one another, with a gap of approximately 2m between the two. Filling this space was masonry <1539> that had a rubble-like appearance, although may well have been a later phase of blocking between the walls. To the south of this and on a partially parallel alignment to <1529>, wall <1540> had the appearance of creating another room or corridor type space contemporary with this phase of building.

The area created by the right-angle of walls <1541> and <1540> and extending to the southern and eastern limits of excavation was marked by occupation surfaces (1535) and (1534). Laminations of burnt horizons, degraded plaster floor surface and levelling sand were all seen in this area as well as *tannūr* oven [1542] set in a plaster floor.

Space 153 on the north side of wall <1529> created by the right-angled turn of the masonry may represent the corner of a room of a building and similarly on the southern side of the wall Space 156 may be the division of another room. This was divided from the floor surfaces seen to the east in Space 157 by wall <1531>, which had a similar constructional appearance to [1529] and is therefore thought to be contemporary.

### ***Northern Compound (Compound 2)***

Although the full northern and western extent of this building is as yet uncertain, it appeared in the northern extension of the ZUEP01 area to be directly comparable in scale to that of the central compound to the south, separated by the east to west alleyway (Spaces 123, 118 and 129; Figures 6.1.2 and 6.1.6). This was aligned on an approximate north-west to south-east alignment. In this aspect it measured roughly 22m north to south and 17.50m east to west. The southern part of this structure appears to be a square shape. It is currently unclear as to whether the northern part of the building represents an intentional and planned layout or a later addition as it appears as if a triangular shaped extension was added onto the side.

If there is some uncertainty concerning the full westerly and northerly extension of the compound then there is certainly little debate as to the southerly and easterly extent. As mentioned, the southern boundary was marked by the wall <475> that formed the northern side of the alleyway, Space 123. This was made from well-bonded limestone lumps and showed a degree of care and permanence in its construction. Wall <1610> represented the northerly turn of this wall, forming the eastern side of Compound 2. This was of a similar construction to <475> and was visible in plan as well in section. The absence of further masonry extending to the east of this wall, both in plan and section, strongly suggests that the compound extended no further in this direction. The later phase city wall was visible in this section and clearly was constructed on top of a bank of sand accumulation (likely to be windblown from the thin, discrete layers seen) after an occupation hiatus. It is noteworthy that the later wall is built on a parallel alignment to <1610> perhaps suggesting a later reuse of the compound, although this remains to be explored during excavation.

Wall <1625> has been tentatively interpreted as the northern boundary of the compound. This was formed from well bonded limestone blocks and was large enough to preclude it from representing an internal division. There was no immediately parallel wall seen in the remaining space between the wall and the northern limit of excavation, implying that if this is the northern extent of the compound, there may well be another alleyway similar to Space 123. This wall certainly had the appearance of representing an external division and is particularly noteworthy as no entranceway or threshold was seen.

The complete western extent of the compound is almost certainly not exposed in the current ZUEP01 area. A wall, <1619> (later becoming <1652>), is the most westerly masonry component recorded. This was narrower than the other supposed external walls and may form an internal division rather than an outer wall. Initially, this extended along the north-western side of the lower square shape of the compound then turned to the north to form the apparent change in direction at the north of the compound. Although this turn lay partially beyond the limit of excavation, where it could be seen it did not appear to represent a separate construction phase. This is also suggested by a wall running approximately north to south and parallel with <1619>/ <1652>. Wall <1621> is positioned to the east of those previously described, forming two rooms (Spaces 161 and 146/8), divided by an approximate east to west wall <1620>. Once again, no apparent change in construction was seen on wall <1621> when it turned from its north-western path to a more northerly one.

It appears, the shift in the alignment of the walls of the northern compound does not represent a later addition to the structure but rather a planned and deliberate realisation of the building footprint. An additional research objective formulated from this evidence must almost certainly take into consider-



**Figure 6.1.27:** Large collapsed arch filling space between Spaces 147 and 155 in Compound 2.

ation reasons for this change in alignment i.e. the presence of pre-existing structures around which the building had to be made or the positioning of unmovable objects such as trees, large stones or monuments. Comparable sized and aligned rooms such as Space 163 and 146/8 have been seen elsewhere in the Zubārah excavations with a suggestion of a materials storage function.

Two possibilities currently exist as to a means of accessing the building. Significantly, both of these entranceways appear to have had an arched feature over them. What was initially interpreted as rubble collapse sealing the western end of the alleyway (Space 123) was later found to be the collapsed masonry of an archway above an entrance on the northern side of the alley (Figure 6.1.26). Space 132 is an entrance hall positioned at the very southwest corner of the northern compound. The room measured approximately 6m long by 1.80m wide. Two projecting stone and render plinths positioned in the alleyway were originally misinterpreted as drain covers owing to their similar appearance to those seen within the Compound 1. These actually represent the pillars upon which the archway rose above the doorway allowing access to the northern compound. The decoration observed on this masonry strongly suggests that this archway was intended to display an impression of wealth or at the very least a heightened significance to other architectural features observed relating to entranceways. This was achieved by careful moulding of the plaster render to achieve a three-stepped column on either side of the door as well as a triangular ‘dog’s-tooth’ pattern across the top. The entrance hall, although not fully excavated, had an additional threshold at the north-eastern end which leads into the compound. A raised plinth type feature in the north-west corner of the ‘porch’ may have been used to elevate a decoration or may be a ‘*hammam*’ type feature for washing.

The second of the two archway covered entranceways was much larger than the first, measuring approximately 3m across. It is proposed that a rectangular shaped room (spaces 147 and 155) formed by wall <1621> on the west, <1622> on the north, <1632> and <1615]> on the east and <1607> formed another grand doorway. This room would have been divided in half by the arch that extended approximately east to west from the plinths <1616> and <1617>. The space to the north of the arch was initially thought to represent a modern disturbance in the area, although it now seems that partial robbing of the collapsed arch from this space may have caused its circular shape. Although visualisation of the arch described in Space 132 above suggests an overhead feature to be admired when entering into the compound, this second archway cannot be said to share the same function. Entering the room from the west would have the archway on the right-hand side. Going underneath the arch into the southern part of the room would lead into closed Space 155 with no access to any of the other rooms of the compound. Clearly, the functionality and relationship between spaces in this area needs to be readdressed, when further occupational evidence has been retrieved.

Several other rooms exist in the northern compound that were identified from the tops of walls but remain filled by rubble, presumably from the collapsed walls and roofs, as well as by windblown sands. Space 142 was bound by wall <1621> on the west, <1625> on the north, <1622> on the south and <1623>. The masonry of these walls had the internal surfaces rendered and appeared to be particularly well made. This led into Space 150 to the east, a sub-rectangular space that would have led into the courtyard of the compound, Space 168.

Space 165 in the north-eastern corner of the compound was again of an irregular shape. It was bounded by walls <1610>, <1626>, <1630> and <1625> and measured approximately 1.50m<sup>2</sup>. No obvious entranceway to this room was visible, suggesting that it may have been accessed from higher up, the threshold having been removed. To the south of this, Space 166 was a room that would have been accessible from the central courtyard and is proposed to represent a living space. The southern boundary of this space, wall <1613> appeared to have been blocked at some point. It is proposed that access to the large rectangular Space 151, would have been possible at one point in the compounds usage. This measured approximately 8.00m in its northwest to southeast axis and was 2.50m wide. It was bounded by the eastern external wall of the compound, <1610> and the wall <1608> to the west. No access to the central courtyard was seen in wall <1608>, and it is suggested this would have originally been through Space 166 to the north. Once again, further removal of rubble filling this room will answer these questions.

A southern room running parallel with the southern external wall of the structure, <475>, began to become exposed as rubble backfill was removed towards the end of the season. This measured some 8.50m long by 2.00m wide. The northern boundary of this room and access route to the courtyard was seen as masonry <1606> and <1609> although there was a gap measuring approximately 6.00m between these two walls. It is possible that either of these walls continues to define the northern extent of the space beneath the rubble fill of the room.

### **6.1.5 Phase 4c: Abandonment/collapse/infill**

This phase was identified by rubble and associated sand deposits filling the occupational spaces of the Compound 1 and 3. The source of these rubble deposits were the walls and roofs of the structures after the supposed partial demolition of the compounds. Evidence for burning in Compound 3, more



so than Compound 1, suggests that this demolition was the result of widespread fire damage. Refining of pottery and coin dates from these layers will allow for a more precise date of this occupational hiatus of the settlement to be obtained and whether it can be associated with the attacks on Zubārah by Omani in 1811 (see Section 2.2).

The rubble infilling of the rooms of the northern compound has not been fully excavated in relation to the occupational surfaces of this building and therefore these deposits cannot confidently be assigned to this phase.

#### **6.1.6 Phase 4b: Reoccupation**

As mentioned in phase 5, wall <482> represented the southern boundary of Space 109 in the north of Compound 1. Following backfill of this space and the Space 125 (the courtyard) by (1024) a curving beachstone and limestone wall was built up against this masonry. This was recorded as <1053> and extended to the south before turning to the west. It had the appearance of a temporary camp or seasonal occupancy feature, rather than the air of permanence of the compound buildings. These typically appear as crude wind-break type structures. The resulting space created between this wall and <482> was labeled as 114 and seen to be associated with multiple *tannūr* features, including (1075) and (1076). These were in turn sealed by sandy and ashy layers (1054) and (1055).

Additional seasonal occupation is suggested by the cutting of pits such as [1023] for stone-lined hearth feature [1022]. This was made through a supposed packing layer (1101) towards the centre of the central compound and overlying the abandonment horizon (1024). Other *tannūrs* such as [1119] and [1123] were seen within cuts [1121] and [1125] made through the abandonment phase layer (1164).

#### **6.1.7 Phase 4c: Abandonment/ Infill stratigraphically sealing reoccupation**

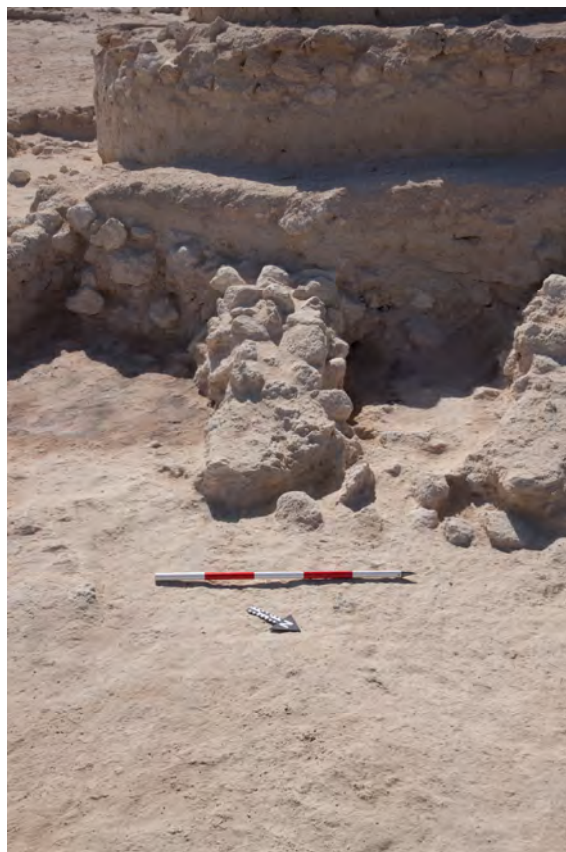
This phase was identified by the backfilling of rooms surrounding the areas where the Phase 3 inner city wall extended across the area. Broadly speaking, this was in the north-east of Compound 1. It was categorised by rubble and sand horizons such as (1107) and (1109) in Space 119, (1104) and (1171) in Space 118, (1264), (1265), (1268) and (1295) in Space 129, and (1095), (1087), (1103) and (1167) in Space 105.

It is unclear whether the rubble horizons were the product of simple abandonment of the site, the supposed catastrophic event that befell Zubārah, or intentional demolition to raise the level upon which the wall could be built. If the former, we might expect to observe a substantial amount of burnt material within these layers, as was seen with other horizons. This is unless there is an explanation for the absence of these burnt layers i.e. they were removed as considered unsafe to build upon, or were simply not there in the first place. Amongst the loci described above, only a few were recorded as containing charcoal and even then only in small quantities. This suggests these infills were not the direct product of the attack on Zubārah.

From observation of the cross-section of the city wall seen in Space 118, it would appear that in this area, the wall is built upon laminations of windblown sands. This would suggest that the site had been in a state of abandonment prior to the wall being built and therefore that the rubble collapses



**Figure 6.1.28:** View of the inner town wall tower in ZUEP01, showing how it was constructed on top of earlier walls of Phase 3 and collapse from those walls of Phase 4.



**Figure 6.1.29:** Detail of one of the walls beneath the tower.

that we see in this phase are also the product of abandonment of the site rather than intentional demolition.

### **6.1.8 Phase 3: City Wall and Tower**

The city wall and tower were identified in the Stage 1 excavations as marking a contraction of the town, as this later wall post-dated the bigger outer wall of the settlement (see Bille 2009). It was also suggested that this might have been the realisation of a large scale civil engineering project designed to show off the communities wealth.

Investigation into both the tower and city wall this season was limited. Wall <445> extending north from the tower was partially removed in order to investigate the spaces of the central compound upon which it was built, prior to their abandonment and backfilling (Figure 6.1.28). It remains in place north of the Space 118 and into the area of the northern compound. It would appear from the removal of the wall and its appearance in the south-facing section of Space 118 that depths of the wall varied substantially, most likely depending on the height of the rubble collapse and windblown sand accumulations upon which it was built. The height of the top of wall would have been consistent and it is suggested that this would have been less than that of the top of the tower. It did become apparent upon the walls removal that this was not a particularly well built feature with the base of the wall made on uneven and undulating ground as well as the stones of the wall appearing to have been crudely and hastily thrown together. Rather than representing a display of the settlements wealth, this evidence suggests the feature was rapidly constructed in order to deal with a perceived threat.

Perhaps more significant, the burnt horizon that was seen to extend beneath the tower in Space 145 provides fairly clear stratigraphic evidence that widespread burning had occurred prior to its construction (Figures 6.1.28 and 6.1.29). Layer (1471) represented the mixture of overburden, burning material and occupational surfaces. Clearly, the further excavation and retrieval of dating evidence from this horizon is a must in understanding the date at which the tower and wall were constructed.

This season's investigation has shown that the Stage 1, Season 1 interpretation of the tower being a D-shape is questionable. It is suggested that the tower was in fact circular and the western side of the feature was badly degraded by the predominant north-westerly weather system, and from stone robbing so much so that it appeared to be semi-circular. Firstly identified last season, the encircling ramp would have had come to an end upon reaching the flat-side of the tower. This seems unlikely and it would have continued all the way round. This would have been notably higher on the western side, with the ramp commencing in the south-western corner of the tower and wrapping around it in an anti-clockwise direction.

It is suggested that further interpretation of these features may be aided with reference to the investigation of other towers across the settlement (see Section 6.3).

There was no indication of the city wall extending south from the tower with masonry apparently following its projected course made from different material entirely and likely to represent later phase features that may have been built abutting the early wall that had since been removed.



**Figure 6.1.30:** Series of walls abutting and protruding perpendicular from the inner town wall on the left. These were built of coarse beach stone in contrast to earlier use of better-quality limestone in Phase 3.

### 6.1.9 Phase 2: Late beachstone walls and pits

Several late phase beachstone walls <1527>, <1536> and <1556> are thought to represent unrendered walls designed to act as animal enclosures. It is thought that <1527> and <1536> extended on a parallel alignment to that of the earlier city wall that would have traversed the area in a north-north-westerly direction.

In the north of the area, walls <1403>, <1405>, <1408>, <1412> and <1420> were all built on a thick layer of windblown sands, abutting the upper courses of the earlier city wall <445> (Figure 6.1.30). These were positioned to make small rectangular units that appeared to mimic the room layout of the underlying compound. The quality of the workmanship appeared to be less than the earlier masonry, with the walls unrendered and made from jagged beachstone cobbles. It is a possibility that if not indicative of temporary, seasonal shelters, then these may have been used for animal corralling. Significance must be attached to the absence of the commonly seen *tannūr* features in these rooms, suggesting a function other than human occupation.

Unlike pits <451> and <470> from the Stage 1 excavations, the late pit [1048] is suggested to be related to domestic waste disposal rather than for robbing stone. This again suggests seasonal occupation of the site. A robber trench was also seen in the southern compound of the area, recorded as [1379] that removed part of wall <1591>.



#### **6.1.10 Phase 1: Overburden**

Much of the windblown sand accumulation that had sealed the central compound had been removed in the Stage 1 work at the start of 2009. One example of a room where this had not taken place was Space 110 where horizon <402> remained.

Spaces such as 130 and 131 were sealed by horizons (1269) and (1306) respectively. These layers were composed of loosely compacted light yellow-grey sands with abundant quantities of abraded pottery sherds, metal pieces and occasional animal bones. These are likely to have entered the deposit through the disturbance of occupation horizons by natural or man-made processes and shouldn't be treated as solid dating evidence.

Deposit (1374) in the northern compound sealed much of the masonry on the lower tier of the area and partially covered the masonry of the later beachstone walls added to the city wall.

#### **6.1.11 Concluding Remarks and Recommendations for Further Work**

With regards to the recommendations for further work detailed in the Stage 1 report (Bille 2009), this season's works have afforded a greater insight into the spatial and functional characteristics of domestic settlement in Zubārah. The previous working hypothesis of the compound representing the dwelling of a family is supported by the number of rooms surrounding the communal space of the courtyard and the reoccurrence of similar architectural features, namely the washing-basins. The number of inhabitants as well as the duration of use is still uncertain, although it is hoped that refining of dating evidence, particularly from pottery and coins, will be able to answer this. Functionality of Spaces deemed not to represent potential sleeping quarters was seen in spaces, such as 110, that was used for cooking. Other functional areas included one set aside for a date press in the southern compound. Decorative architectural elements, such as the etching of the dhow, the dog-tooth pattern incised into the lintel above doorways, representative entrance hall, and the discovery of a pearler's box during the 2009 season (Bille 2009), suggests that the inhabitants of Compound 1 at least were an affluent group, perhaps belonging to the merchants who were involved in the pearl trade.

The expansion of the excavation area and the discovery of what are thought to be contemporary occupational premises to the north and south has provided an insight into decisions relating to the physical layout of the settlement. It would appear that the compounds share similar building styles not only in dimensions but also in choice of building materials, access and the positioning of a courtyard in the centre of the buildings. The courtyard houses found in ZUEP01 reflect traditional, common features of vernacular Arabic architecture, with a concern for privacy and a centrality of the courtyard quite evident.

Suggestions relating to town-wide planning considerations are implied not only by the positioning of domestic occupation units at a set and consistent distance from the shoreline, with notably different functional areas between them, but also of one if not more thoroughfares leading from east to west. The style, hierarchy and system of governance or a body responsible for these planning decisions certainly poses interesting questions.

The newly discovered northern compound (Compound 2) was only excavated to a depth where definition of wall alignments and rooms was possible. This was relatively simple in that the majority of

these spaces were filled by rubble horizons and windblown sand. A key objective for next season's work will be to remove these fills and attempt to assign functions to these spaces. Functionality of rooms in the newly discovered southern compound (Compound 3) was possible. A date press, courtyard and room with repeated resurfacing of floor layers cut by *tannūrs* with stone diving weights and an ablution feature were also seen. Again, further material evidence from sealed horizons will answer the research objectives relating to the age of the compound, duration of use, reason for abandonment and potentially status of those living there.

A recommendation following last season's work was to investigate the depth of archaeology via a sondage in one of the deeper cut features of the site, where disturbance of floor surfaces would be minimal. An insight into potential beach deposits representing culturally unmodified and archaeologically sterile natural stratigraphy was in three places across the area. Whether this in fact represents the termination of settlement at the site is not 100% certain. In at least one of the areas observed, there appeared to be features cut into this sand horizon suggesting occupation of the site prior to the compound phase of construction. Whereas it is possible to investigate these features further through isolated trial trenches, it is the complete and phased sequential excavation of all features across the area is realistically the only means by which this research question can be confidently answered. This however would require the removal of later phase architectural features and hence the destruction of the standing wall foundations. Nevertheless, it remains debateable whether smaller targeted trenches would answer this objective sufficiently.

Occupational hiatus was observed in the Stage 1 works by the supposed abandonment of the Compound 1 and the building of the potentially defensive city wall and tower. Archival research conducted following this season's excavation has identified at least one possible catastrophic events that may have lead to the temporary abandonment of the site. As previously discussed (see Section 2) an Omani naval forces attacked the then Qasimi-and Wahabi-occupied coastal settlements around Qatar, including Zubārah. Written sources suggest that the settlement was completely torched and it is subsequently described as a 'small settlement amongst extensive ruins' in survey reports dating to the 1820s (Brucks 1824). Identification of this historical event with archaeological signatures documented in Zubārah may be very difficult without firm dating evidence. However, bombardment from naval vessels and subsequent razing of the settlement could have easily produced the layer of burning seen across the site. Once again, full stratigraphic exposure of these horizons and the associated collection of good quality dating evidence should be something to be explored but may be hampered by masonry that has to be left in place.

Interpretations from the last season's works that the tower was D-shaped now seem unlikely and that it would have in fact been circular seem more credible. This contrasts with the findings from ZUE-P03 where Inner-Town-Wall-Tower 11 was found to be D-shaped (see Section 6.3). However, there is no reason to assume that this was necessarily a standard plan for towers across the settlement. It is envisaged that the surviving ramp encircling the western side of the tower was elevated to a height where it became increasingly degraded compared to the masonry surviving to the east, possibly as a result of robbing or from bearing the brunt of the prevailing north-westerly weather system. This may have lead to its removal as part of the supposed rubble backfill of the compound in the previous season. The implication as part of a recommendation for further work in last season's report that the later inner city wall may have represented a display of wealth or prestige as a manifestation of grand civil engineering projects also seems unlikely. During its removal, it was noted to have been rapidly

built on comparatively uneven ground, suggesting it more likely to have been built quickly and as a response to an attack on the settlement. Indeed, the expanded area to the south of the tower failed to recognise masonry representative of a grand or large-scale south-eastern extension of the wall, although several later beachstone constructions may have been built up against it on a parallel alignment.

To the east of Space 110, the northern extent of Space 106 was previously unclear. It now seems that this would have led into the central courtyard of the compound. The easterly extent of space 105 was also a modified research objective from last season. Expansion of the ZUEP01 area identified several walls that appeared to be contemporary with the eastern external wall of the central compound, being partially obscured by the later tower and rubble from it and the associated city wall. These appeared to be keyed in to the compound walls although the spaces they created cannot confidently be identified as being of a comparable function. Certainly, more work needs to be done in this area so as to ascertain functionality and date. It is notable that a rendered stone basin and a potential outflow pipe appeared to be associated with domestic habitation although two smaller rooms further to the west would seem too small for habitation and if not related to animal shelters then could have been used for materials storage. A possible north to south aligned alleyway was positioned further to the east of this area although once again requires further excavation in order to assign functionality.

## 6.2 Excavations in ZUEP02

*Michael House*

### 6.2.1 Introduction

Zubārah Excavation Point 2 (ZUEP02) area of excavation is located inside the inner town wall of Al Zubārah slightly to the north of centre overlooking the beach about 50m southeast of the QMA's excavations of the area identified as the 'suq'. For the purpose of this report the area excavated this season will be divided into four distinct areas and discussed accordingly. All are stratigraphically linked and are only discussed separately to facilitate discussion. These areas are:

- I. The Northeastern Area
- II. The Western Central Area (including the Northwest corner of the Phase 03 compound).
- III. The Eastern Central Area
- IV. The Southeastern Area

Fieldwork this season had several distinct aims to try and get a better understanding of the area and its function (either static or changing) throughout the development of Zubārah. These are outlined in Section 3.2.2.

The architectural phases in ZUEP02 can be summarized as follows:

**Phase 01** – Post occupation, abandonment and collapse, without further reoccupation.

**Phase 02** – Late phase, rough (beach stone) dry-stone walling, most likely post abandonment of Zubārah as a functioning city, some crude repairs.

**Phase 03** – Rough weakly cemented mainly beachstone walls with some mortar render, but generally poorly finished walls. These are represented by the compound structures (Spaces 001, 002, 005, 006, 007, 008, 009, 010 & 033); the eastern structure (Spaces 019, 020 & 021); the date processing complex (Spaces 011, 029 & 017); the western extension (Spaces 022, 023 & 032) and the Northeastern structures (Spaces 12 & 13). Many of the structures within this phase show evidence of major fire damage prior to abandonment. Some of the structures appear to have limped on for a short time after, but generally speaking this seems to represent the end of this phase.

**Phase 04** – This is an intermediate phase, a large open area with little or no stone architecture but with a great deal of activity, cut into the shell and sand surfaces were many tannūrs, fire pits, post and driven stake holes. This is most likely indicative of temporary seasonal camps between the major architectural phases.

**Phase 05** – Early architectural phase, which is below the compound and consist of well-constructed walls of beach and limestone with fine hard plastered surfaces, and in the northeast represented by





Spaces 003, 014, 015, 016, 024, 030 & 031. In the southeast by Spaces 025, 026, 027 & road/street 028.

## **6.2.2 Northeastern Excavations Area - Road/street & Northeastern Complex**

### ***Phase 05 - Plastered Beach & Limestone Architecture***

This is the earliest phase yet identified within ZUEP02 and can be sub-divided into three sub-phases: Sub-phase 05a – Construction; Sub-phase 05b – Occupation/Development; Sub-phase 05c – post occupation abandonment. Due to the continuous nature of the excavation the phasing of some of the currently unexcavated floors and walls may have to be evaluated in future excavations.

This phase consists of six spaces, which functioned with the contemporary NE – SW aligned road/street Space 03 (partially exposed in the 2009 season; Bille 2009). The north wall defining Space 03 is the southern boundary of these rooms (Spaces 015, 106 & 024). None of the rooms have any direct access to this road/street. However, they have not been constructed at a right angle to the road, instead they run parallel with each other but project from the road wall at a slightly oblique angle. These rooms appear to be the southeast corner of a larger complex spreading to the north and east beyond the limit of excavation. To the west of the complex is a large open space or courtyard bounded by a N-S orientated remnant wall. This wall <2775> also bounds what could be a N-S aligned street or return of the E-W street Sp.03 (Figure 6.2.1).

### ***Phase 05a – Construction & post excavation discussion***

Spaces 015, 016 and 024 make up the original complex, with Spaces 014, 030 & 031 having been added later as a western extension (Figure 6.2.2). This development is linked to a major restructuring of the southern wall of Spaces 015 & 024 and the formalization of the road/street Space 003. All the spaces within the complex were coated with a reddish brown hard gypsum plaster, which did not survive well around doorways and on thresholds. (Figure 6.2.3)

Space 24 is located against the eastern limit of excavation, measuring 4.50m NW-SE x 2.00m SW-NE, but continues beyond the eastern baulk. At abandonment the only visible access was to Space 016 to the north. Space 24 extends northwest on its long axis away from the street in the south, and shares its western walls <2128> & <2625> with Space 015 to the west. Its southern wall <2626> survives in six courses to a height of 0.93m. This wall is also the southern wall of Space 15, and defines the northern limit of the road (Space 03). Its northern wall <2195> forms the entrance through to Space 016.

North of Space 24 and to the east of Space 15 is Space 16, which provides access to both. It is likely this is some form of large entrance hall to the complex with the main entrance being located where the drainage cut [2278] is positioned. Two door jambs, one in the north on wall <2576>, and one in the south on the NE corner of <2240> & <2076>, mark its exact position.

Space 15 is a long thin room (7.40m x 2.50m), with its long axis running NW from the road. It is located between Spaces 24 & 16 to the east as well as 16 to the north, and Space 14 to the west. This room has been radically altered in its life, with the complete removal of the southern wall, and an



**Figure 6.2.2 :** Post-excavation view of Spaces 03, 15, 16 & 24 in Phase 05a



**Figure 6.2.3:** Plaster dividing walls in Spaces 30 & 31

extension <2625> being added to the eastern wall <2128>. This addition extends 1.70m to the south where it is bonded to a complete rebuild of the southern wall <2626> to form the new street projection. The room can only be accessed from Space 16. An entrance to Space 24, which functioned with the eastern wall extension, was blocked up by <2624> prior to abandonment. As with Spaces 016 & 024 several floor surfaces have been removed leaving a leveling deposit (2566).

The smaller room (Space 14) measures 5.50m x 2.20 – 2.50m and was a later addition to the west of Space 015. It was most likely built at the time of the wall adjustments to Space 015 and formation of the street (Space 03). Access is in the NE from an open area (possibly a court yard). The southern wall <2627> abuts the western wall of Space 15, this southern wall is shared by Spaces 30 and 31 to the west. The western wall of the space, <2581>, is the same build as the south (bonded), and is heavily truncated to the north. The floor (2241) was stained bright orange and yellow by the overlying abandonment infill.

Spaces 30 and 31 are located to the west of Space 014, and appear to have been constructed at the same time. The three Spaces form the western extension to the complex and may represent an ablution facility. Space 30 is formed within Space 31 with two thin (non load bearing) plastered dividing walls (Figure 6.2.3). Space 30 measures 3.00m x 1.50m and has a hard plaster floor (2586). Space 31 is heavily truncated to the north and is L-shaped in plan, formed by the construction of Sp. 030. It measures 3.50m x 3.30m (at its widest).

#### *Sub-Phase 5b – Development*

Only a small amount of excavation was undertaken in this phase to gain an understanding of the life span of the structures and a glimpse at possible functions, without removing the structures completely.

The earliest as of yet unexcavated deposits are two leveling or bedding deposits (2566) in Space 15 and (2565) in Spaces 16 and 24. With the exception of the cut features in Space 16, both 15 & 16, have the same stratigraphic sequence of development.

In Space 15 this layer was sealed by floor/surface (2230), which was covered by an impressive assemblage of broken ceramics (2170) concentrated primarily in the north of the space (Figures 6.24-6.28). Scattered amongst these were a number of field objects including a small stone or clay weight, several ground stone tools, yellow glass slag (waste), a bronze coin, a chunk of bitumen covered with a reed impressions, and two molded plaster semispherical fragments. This was then sealed by a highly fragmented, trampled surface (2177) prior to abandonment.

In Spaces 16 and 24 the floor (2331) overlies an unexcavated leveling/bedding layer (2565). The next sequence of deposits were contained in Space 16, and did not extend into Space 24. They consisted of a small irregular pit [2273], with no obvious function located in the SE corner of the space. The second was another small pit [2336], which contained a large quantity of fish bone, as well as some ceramics and a weight. The third was a drainage gully [2336] running NW–SE across what could be the entrance to the complex. The base of this cut appears to have been plastered (2341), which extends below walls <2096> and <2578> placing it within the construction phase. The re-cut and backfill seen at this stage may be related to some form of repair or servicing. The re-cut was backfilled





**Figure 6.2.4:** Space 15



**Figure 6.2.5:** Detail of Space 15 pottery spread





**Figure: 6.2.6:** Detail of storage jar fragments in SP. 015



**Figure 6.2.7 :** Chunk of bitumen with reed impressions under excavation amongst the Sp. 015 pottery spread

with a deposit of loose sand and stone (2277). Covering the fill of pit [2336], and scattered across the entire floor of Space 16, was another large ceramic spread (2250) (Figure 6.2.8).

The floor in Space 14 (2241) was partially excavated this season and, like the exterior floor/surface (2587) in the open space to the north, was stained bright orange and yellow by the overlying deposits (2045) & (2069).

#### *Sub-Phase 05c – post occupation/abandonment*

This phase consists of a sequence of deposits linked to demolition and or collapse, or post abandonment dumping. In Space 15 the floors were covered by a loose silty sand rich in material culture (Locus (2133)) reflecting a time of post abandonment dumping mixed with natural decay of the surrounding structure. From this point on the post occupation sequence in Spaces 15, 16 and 24 is very similar: a group of leveling or collapse deposits (2120), (2207) & (2212) filled three respective spaces, followed by (2061), (2191) & (2197), a group of deposits linked to either deliberate demolition or natural post abandonment wall collapse. The sequence was capped by (2099), (2196) and (2202), which are upper leveling deposit in preparation for the construction of the phase 03 structures.

Located in the NE corner of Space 14 were two primary deposits (2735) and (2739). These deposits consisted of charcoal, burnt wood and bitumen and could be burnt roofing material. They were however very discrete and there is no sign of scorching on the walls. This is unlike other structures in and around the Phase 03 beachstone compound which most certainly suffered termination by fire (see below). They were sealed by (2069) covering the open area or court to the north as well as filling Space 14. Deposit (2069) was a vivid orange colour unlike any other deposits in ZUEP02. It appeared to contain lumps of yellow pigment and bitumen (Figure 6.2.9 & 6.2.10). A soil sample was taken for a composition analysis to both characterize the origins of the orange-yellow staining, and to check for any potential hazards. The results were that the colouration was due to higher than usual levels of iron. This iron rich dump also contained inclusions of numerous ceramic and animal bone fragments. It is likely that the iron content is a by-product of some industrial process that occurred nearby, but probably has no bearing on the function of the space. It could also be the result of leeching from the overlying deposits. Locus (2191), a layer of rubble collapse/demolition (discussed in the sequence of Space 16 above) spread out into the open space north of neighboring Space 24 partially covering (2069).

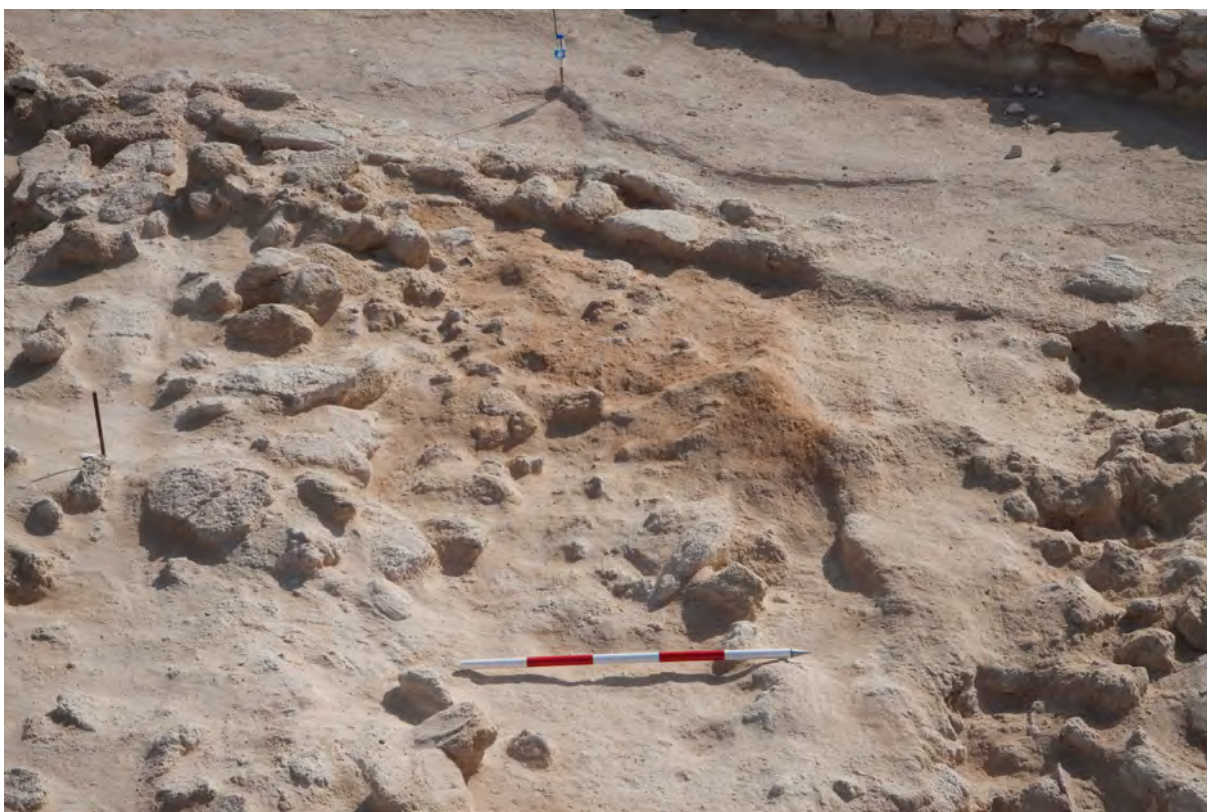
Space 14 (2069) was capped by two collapse deposits which appear to abut each other (2060) east & (2070) west. This single event is probably sheet collapse from the walls to the east and west ending the abandonment phase within this space.

In the open courtyard to the north the primary abandonment deposit locus (2245) covered a large area 7.60m x 5.70m x 0.07m (Figure 6.2.11). This was another compact orange iron rich layer of silty sand, with numerous inclusions of smashed ceramics as well as other cultural material. It was in turn partially covered by (2069), and to the west by locus (2443) a mix of rubble and windblown sands surrounding Sp.031 on three of its four sides. It also covers the exposed portion of the street (Space 03) to the south. This was sealed by another large mixed deposit of windblown sand and rubble (2428) covering an area almost 10m square to the west of the complex. The rubble layer was then cut





**Figure 6.2.8:** Exterior (?) pottery spread in Sp. 016.



**Figure 6.2.9:** Detail of deposit (2069)





**Figure 6.2.10:** Detail of deposit (2069).

by a single fire pit [2439] /(2438), clearly demonstrating some minimal activity within this phase of post occupation.

At the western end the sequence above Spaces 030 and 031 and the exterior space to the north is as follows: a large leveling layer (2270) covers the (2363) collapse in Spaces 030 and 031. Locus (2085) covers (2270), which is itself covered by (2047). Both are layers of beach stone rubble mixed with sand and mark the end of the post occupation phase.

#### ***Phase 04 - Intermediate Open area, with temporary structures***

This phase is not well represented in this sub-area of excavation. As with Phase 03 this may well be a direct result of the horizontal truncation from site preparation or leveling for subsequent construction. The only deposits that can tentatively be placed into this phase are located to the west of Spaces 12 and 13 where little later construction took place.

Sealing (2270), a leveling deposit from the earlier phase, was trample surface (2269). This was composed of silt and sand with common shell inclusions, containing mortar and beach stone fragments, and may well be a small part of a demolition horizon. Above this was a, discrete, possibly dumped, deposit (2268), which was sealed by a second trample surface (2332).

The sequence is sealed below <2199> the northern wall of Sp. 009 (see Area II Phase 03).





**Figure 6.2.11:** View of Sp. 14 and deposit (2245) in front of it



**Figure 6.2.12:** Overview of Sp. 12 and 13 of Phase 03

To the north of these two patches of surfaces were a group of post holes forming a possible structure, which measured 4.50m NW-SE x 2.50m NE-SW cutting the surface of N-S road (2764) crossing the eastern wall of the road <2775> and cutting surface (2587). A total of 16 posts formed what appears to have been a rectilinear structure.

### ***Phase 03 – Beach stone compound and associated structures***

The heavily truncated remains of one or two structures are present in this phase. Spaces 12 & 13. Sp. 12 appears to follow a similar alignment to the earlier structures below NW-SE, but only two of its walls survived as a base or foundation course. The eastern wall forms the division and only wall of Space 13 to the east. This alignment may suggest that this is a different phase from the compound to the southwest, and this may need more refining at a later date (Figure 6.2.12). Both spaces have associated floors and features.

The phase has three sub divisions in this area; Sub-phase 03a – Construction; Sub-phase 03b – Occupation/Development; Sub-phase 03c – Post occupation Abandonment.

#### *Sub-phase 03a – Construction (Sp.012)*

This phase of this structure's development is very ephemeral with the partial survival of only two of its walls. The two-fragmented single course rubble built beach stonewalls, <2089> and <2129>, appear to have been the location of at least one entrance into the room from Space 13/18 to the north and east. The marginal survival of these walls makes interpretation about the building's overall size difficult.

#### *Sub-phase 03b – Occupation/Development*

Alongside the walls was locus (2088), a silty sand and shell surface/floor. This surface was cut by four *tannūrs*, three of which were located at the room's southern limit and one located centrally. Three of the *tannūrs* were aligned approximately E-W close to what would most likely have been the south wall of the space. Of the *tannūrs*, three were circular and constructed with ceramic linings. The fourth was rectangular and constructed using recycled wall plaster. This distinct change in form possibly relates to a specialized or alternative function. (Figures 6.2.13 & 6.2.14)

The *tannūrs* were surrounded by a layer of ash (2018) this was most likely rake out of the *tannūrs*.

#### *Sub-phase 03c – Post occupation Abandonment*

The space was finally leveled and backfilled with a shallow leveling or demolition layer (2010).

Located to the north and east of Space. 12, Space. 13/18 also suffered from the same massive horizontal truncation or leveling that occurred prior to the construction of the late phase wall <201>. It is unclear whether this was a covered internal space part of a complex of rooms and corridors associated with Space 12 or a surfaced external space. Excavation further to the north and east beyond the current limit of excavation (L.O.E.) may shed some light on this.





**Figure 6.2.13:** Tannūrs of sub-phase 03b before excavation



**Figure 6.2.14:** The tannūrs after excavation



*Sub-phase 03a – Construction*

Space 013/018 shares both walls with Space 12. At the time of excavation this space formed an inverted upside down L-shape with wall <2129> forming its southern wall, and wall <2129> its western boundary.

*Sub-phase 03b – Occupation/Development*

The primary shelly surface (2087), like that of Space 12, abuts both highly truncated containing walls <2089> and <2129>. This space was later resurfaced with locus (2147), a compact silty sand floor, with common shell inclusions. This resurfacing as well as containing ceramics and animal bones also produced a single copper alloy coin.

This surface was cut by a group of postholes and or fire pits, all located in the northeastern corner of the excavation area. The cut features included four postholes [2169], [2150], [2127] and [2144], and two possible small fire pits or postholes [2104] & [2125]. The fills of the postholes, as with many of the others in the ZUEP02 excavation area, were generally single events the fills consisting of soft, loose, silty sands, with common shell inclusions. They appear to have been backfilled after post retrieval of the post. Occasionally small fragments of the post would remain as with (2168) the fill of [2169].

These cut features were then sealed by a second resurfacing represented by loci (2107)/(2112), both of which are silty sand and shell surfaces. These were cut by two small shallow post or stake holes [2019] & [2021] containing ash and sand fills (2020) & (2022).

*Sub-phase 03c – Post occupation Abandonment*

Two primary collapse deposits (2079) & (2131), a mix of rubble collapse and mortar from the demolished/leveled walls mixed with wind blown sands, sealed the patchy floors, and cut features. (2079), was capped by a discrete dump of burnt material (2017). All were sealed below two leveling/infill deposits (2009) & (2012).

To the west of Spaces 12 & 13/18 was a large open area (9.10m x 8.50m) covered by (2013), a large leveling deposit performing a similar in function to deposits (2009)/(2012) & (2010) which sealed Space 12. These are the leveling deposits for the phase 02 build.

*Phase 02 – Late phase repairs and activity (dry stone walls)*

Constructed over the leveling deposits (2010), (2009/2012) & (2013) was the only feature of this phase within this area, a large curvilinear rubble built beach stonewall <201> (Figure 6.2.15) and its bedding layer (2002). This wall was a simple construction measuring 12.70m in length x 0.80m in width x 0.50m in height, and was aligned approximately E-W the last few meters in the west curving to the north. The function of this feature is unclear, but it does not appear to be a structural, load bearing wall, and may well have been a windbreak.

*Phase 01 – Site wide Post Occupation*

Much of this area had been striped of its overburden last season leaving just a small area of rubble collapse (2375) located against the northern L.O.E. and a large pit [2357] filled with clean wind-blown sands. The pits function was unclear.

**6.2.3 The Western Central Area (Area II) - Including the Northwest corner of the phase 03 compound***Phase 04 - Intermediate Open area, with temporary structures*

The earliest locus in this area is (2332), a trample /construction surface, on which the northern wall of Space 09 was built. This layer also stratigraphically links this area to the northeastern area excavation (Area I).

Two other partially excavated deposits probably from this phase could be seen within pit cut [2425]. The first appears to be just wind blown sand (2142), while the second (2327) appears to be some form of compact leveling deposit or surface (2327).

*Phase 03 – Beach stone compound and associated structures*

This phase was represented by the construction, development and final abandonment of five structures: Spaces 07, 08, 09, 10 and 33 that form the NW corner of the beach stone compound, as well as an abutting western extension designated as Spaces 022, 23 and 32.

*Sub-Phase 03a – Construction*

Since none of the original walls of the structures in this phase have been excavated the phasing is based on structural association and construction techniques. The earliest structures appears to be Spaces 007 to the east and Space 09 in the northeast and Space 05 to the south.

To the west of Space 09, Space 08 was constructed in a mirror image. Space 08 utilized the western wall <2200> of Space 09, abutting it in the northeast with the addition of a NE- SW aligned wall <2883> (the north wall of Sp.09). This was, in turn, abutted by locus <2795>, the eastern NE-SW orientated wall of Space 08. The southern terminus of this wall forms the entrance to the space with the southern wall <2659> built in the same way with a rubble core and stone faces. This wall most likely abutted the eastern wall of Space 09, but the relationship has been removed by a late pit truncation [2799].

Later in the compound's life the through space between Space 07 and Space 05 to the south was closed with wall <2071> to the west and wall <2889> in the east. This effectively prevented access to the compound in this area, with the only access to the newly formed room Space 10 being from the compound itself through the eastern wall over threshold <068>. The western wall <2703> may offer some insight into the rooms function as it has been constructed with a ventilation slot slightly north



**Figure 6.2.15:** View of curvilinear beach stone wall <201>



**Figure 6.2.16:** Ventilation slot in wall <2703>

of centre (Figure 6.2.16). The wall appears to have utilized/reused building materials worked stone and plaster slabs, most likely taken from an earlier Phase 5 structure.

A broadly contemporary build occurred to the north of Space 07, with two coarse beach stone walls, <088> to the east and <2703> to the west closing the gap with Space 09 to the north. This may not have been a complete closure like that of Space 10 in the south, but a restriction of access as despite the poor survival of the two walls they both appear to have entrances. They could have been part of an entrance hall for the compound.

Either during this period of expansion, or later, a large structure formed of two Spaces (022 & 023) was added to the west of the main compound abutting the southern half of the western wall <2008> of Space 07. The construction of this building appears rather poor; the walls are well cemented but the stone used seems poorly selected and the alignment is slightly off with the earlier compound structures to the east. Although it is hard to see the bonding or abutting relationships of the walls, it would appear from its plan form that the larger Space 23 was developed first with an entrance in the SE corner of wall <2708>. Later the small Space 22, located to the east, was built by bridging the space between the eastern wall <2710> of Space 23 and the western wall of Space 07 with two small walls. An entrance between the two was formed in the south of the dividing wall <2710>.

#### *Sub-Phase 03b – Development*

Space 09 was only excavated to the latest sand and shell floor (2029). This was cut [2032] at the southern end by a single circular *tannūr*, which was lined with a slightly silt based sand and ash (2031), and the filled with (2030) a loose mid grey brown, sandy ash. Just to the south of this, against the southern wall <086>, was a small ceramic spread (probably a single broken vessel), which was recorded as part of the sealing/abandonment backfill (2024) (Figure 6.2.18).

In Space 08 the earliest floor excavated to date was locus (2028), a firm light grey white, shell surface. This was cut by two (unexcavated) postholes [2044] & [2045] at the eastern end of the space. At the center and at western the end of the space were two charcoal rich deposits and remnants of burnt posts (2027) & (2043). All of this was sealed below (2023) a second floor/occupation surface. This was cut at the center of the room by [2042], a large circular post hole or pit, which was filled by a single sand fill (2049). Covering the floor at the entrance was a small discrete layer of silt ash and sand, which represents the final deposit prior to abandonment and backfilling.

Space 07 was excavated to the earliest make up and surface locus (2784). This laminated, very patchy, highly burnt silt-sand surface was covered at the northern end by a layer (2048) of burnt material that included wooden beams and fragments of carbonized palm leaves. This appears to be primary roof collapse associated with a major fire. This was sealed by (2014), a very mixed deposit containing lenses of burnt roof collapse, amongst a silt ash and sand matrix. This burnt material was dark grayish black in colour, with light orange grey and light yellowish brown mottled lenses.

The layer was rich in cultural material a majority of which appears to have either been on the floor surface at the time of the fire or suspended from the walls or roof and fell to the floor as part of the collapse. This included some large ceramic fragments, some metal building materials and plaster fragments with timber impressions in them (from the roof purlins), a single coin, and a large assem-





**Figure 6.2.17:** View of Sp. 008



**Figure 6.2.18:** Detail of SP. 007





**Figure 6.2.19:** Overview of Sp. 0707 showing multiple diving weights lying on the floor surface



**Figure 6.2.20:** Detail of line-up of diving weights in Sp. 007

blage of pearl fishing weights and fishing weight fragments, some of which were fire cracked (Figures 6.2.19 & 6.2.20)

In total ten of these weights were recovered intact and another six as fragments. The weights were large and heavy, mica-rich stones of a teardrop/ triangular shape with a hole at the tapered end. Most were located along the western wall. In the center of the room was a charcoal ring with a hole at its center this could have been a wooden marker buoy. This room was most certainly associated with the pearl fishing and may have been a net drying room, or storeroom for fishing equipment.

(2014) was sealed below (081) a compacted, trample surface, possibly associated with the rebuild of the western wall <2007> after the fire damage. The walls of the building were also burnt on the inside, with most of the soot damage and scorching located in the southern half of the building. This burning event may be associated with the termination of other structures in this phase (Spaces 02 & 19).

On the northeast corner of Space 07, where its northern wall <077> is abutted by <2703>, was a small sequence of deposits reflecting the events that occurred within the room. The first was a highly burnt remnant floor surface (2086) formed of compacted silt sand mixed with ash, which could relate to the burning inside Space 07. This was sealed by a layer of charcoal and sand (2078), containing common ceramic and bone, which probably is occupation build up. Above this was a burnt deposit containing charcoal and ash, which was sealed by locus <2007>.

The earliest floor in Space 23 thus far excavated was locus (2338), which covered the entire space. It consisted of a patchy, whitish-grey ashy sand with numerous shell and charcoal inclusions. Above this, at the eastern end in front of both entrances, was a finds spread (2339) consisting mainly of ceramics with many conjoining sherds. The deposit also included several nails, a hammer stone, grind stone, and common bone (Figure 6.2.21). This was covered by locus (2328), a thin but compact occupation build up (also confined to the eastern end) with numerous shell and charcoal inclusions and ash pockets or lenses throughout.

At the western end was a very different sequence, three floors/surfaces, the first a blackish grey, ashy silt and shell layer (2329), covered by locus (2305), a more compact light orange brown silt sand and shell deposit, which was in turn superseded by (2275), a fine clay like surface with common shell, covering just over half the space.

Both western and eastern sequences were then sealed below (2274) a makeup layer or packing layer for locus (2175), which is a compact floor/surface covering most of the space. In front of both entrances it was truncated from erosion by foot traffic. This represents the last formal floors/surfaces in the buildings internal development.

To the south of Space 23 and abutting the western wall <2705>, is locus (2279), an external shell-sand surface. This is sealed by (2780), a later surface that extends along the entire length of the northern wall of Space 23, to the east where it was truncated by a large semi-circular pit [2425]. It occupies the external space formed by the inter-section of Space 22 northern wall and the western wall of Space 07.

In Space 23, constructed above (2780) along the edge of the pit cut, was a curved enclosing wall <2248> which abutted wall <2007> in the north and <2706> in the south. The wall measured 5.50m x 0.64m x 0.37m and was constructed mainly of coarse beach stone with occasional limestones, of

random or irregular coursing (1-2 extent) and weakly bonded with a very sandy mortar (Figure 6.2.23).

The earliest locus visible (unexcavated) in Space 22 was (2887), a highly compact clay sand and stone deposit. Above this were two Loci: a blocking event <2253> in the north of the space filling a possible early entrance, and a small spread of ash and charcoal (2247). This was sealed by a very compact, pinkish grey clayey sand full of numerous small selected pebbles and charcoal. This is effectively a very hard wearing, metallised surface possibly indicative of some form of heavy duty process that was undertaken in this space. Partially covering this in the SE corner was a small remnant of another compact clay sand surface (2242).

This was all sealed below (2237) a mixed layer of occupation build up and burnt roof collapse over the eroded floors.

#### *Sub-Phase 04c – Post Occupation/Abandonment*

Space 09 was filled by a loose soft sand and beach stone rubble locus (2024), which was very similar to other abandonment deposits of wall collapse across the site. Most of the stone was located in the NW corner of the room. Locus (2024) was then sealed by locus (2015) which also filled Space 08 to the east.

Space 23 was filled with (2174), a rubble in-fill, which is probably a demolition dump as the baulk of the stone was located towards the centre of the space, and not at the edges, which were sand filled. This locus was sealed by a compact trample surface (2140), probably a construction horizon associated with the rebuild to the western wall of Space 07. A natural depression at the center of the space formed by the collapse/demolition deposit below was filled with a clean windblown sand (2134).

Covering the mixed roof collapse and occupation dumps in Space 22 was a compact trample surface with ash lenses (2228). This was covered by locus (2213) a layer of secondary, burnt roof collapse and ash. Sealing this was wall collapse or demolition plaster and mortar fragments Loci (2008) and (2176). These were capped by a layer of compacted sands (2206), which formed the construction horizon for wall <2007> to the east (Space 07). To the northwest of this, covering (2206), was a small deposit/dump of rubble mixed with wind blown sand, which was finally covered by (2135), which were sealed below rubble collapse (2000) – phase 01.

In Space 32 consisted of a pit filled with a sequence of deposits: (2342), (2246), (2153), (2136), and (2137). The fills of the pit say very little about its function. However, the wall and a lack of large quantities of cultural waste indicates it was something other than a simple waste pit. Covering this sequence was a trampled deposit (2139) abutting the exterior of the western wall of Space 07, associated with the rebuild <2007>.

#### *Phase 02 – Late phase repairs/ rebuilds and activity (dry stone or poor quality walls)*

Within this phase most of the Loci are related to attempts to prolong the life of the compound, but not necessarily all of the associated buildings indicating partial abandonment. The earliest is locus <2007> a late phase repair or partial rebuild to the western wall of Space 07. This appears to have occurred after the fire that gutted the structure destroying the roof, and after the demolition of the





**Figure 6.2.21:** Occupation surface (2339) in Sp.023



**Figure 6.2.22:** Sp.032





**Figure 6.2.23:** Later beach stone wall <2007> overlying the earlier wall <2008> in Space 22 & 23



**Figure 6.2.24:** Space 09 & 09 prior to excavation in Phase 2

western building (Spaces 22 & 23) that also appeared to suffer termination by fire. The rebuilt beach stone and sandy lime mortar wall <2007> had a southeast face constructed flush with that of the earlier wall <2008> (Figure 6.2.23) below. However, unlike the earlier wall, which was a standard 0.54m wide, the rebuild was an – in this area – unparalleled 1.00m wide, surviving to a height of 0.40m (two courses), and sealing the abandoned and leveled/filled Spaces 22 and 32.

Wall <2008> was abutted at the northern end by locus <037>, a very loose poorly constructed rubble built wall extending NE over the abandonment/leveling deposit (2015). Its southwest return <023> contained two mica-rich stones (exotic) fishing weights (Figure 6.2.24). A large number of these were found in Space 07 below the occupation or abandonment build up layer (081).

A remnant floor/surface (2192) seals a group of demolition/leveling deposits connected to the demise of western building (Spaces 22 & 23) from sub-phase 4c.

#### *Phase 01 – Site wide Post Occupation/abandonment*

This phase is represented by a series of deposits, mainly external collapse from the western walls of the compound or walls of spaces that make up the compound's western limit. As these walls have deflated over a relatively long period of time they are often mixed with thick lenses of laminated aeolian and/or aeolian sands.

These include locus (2000) a fusion of two deposits (808/058) identified last season but not excavated. This massive layer of rubble collapse was located at the NW corner of the compound. The collapse was derived from two Phase 02 walls <037> to the west and <023> to the north.

A couple of meters to the south was collapse locus (2051), associated with the decay of the four walls forming Space 10.

In the southwest below the windblown sands covered two more, loose beach stone mortar and sand deposits (2063).

### **6.2.4 The Eastern Central Area (Area III)**

#### *Post excavation discussion of Visible Early Phase 05 deposits and architecture*

Next season the removal of loci in Space 29 and its associated internal and external surfaces (discussed in Area IV) should free up earlier archaeological deposits and provide the southern extent of surface (2041), as well as creating a solid stratigraphic link between Areas III & IV. Some of the early Phase 05 architecture can already be seen emerging from below (2041). These N-S aligned walls extend south from the southern E-W aligned wall <2668/244> of the Phase 05 road/street (Space 03), and form four or five rooms or spaces filled with rubble collapse or demolition. At least two of these match the alignment of the exposed walls of the southern Space 26 (Figure 6.2.1). Whether they will meet remains to be seen.

### *Phase 04 - Intermediate Open area, with temporary structures*

This is the most abundantly represented phase within this area of excavation. It has been subdivided into three sub-phases, each one linked to an established external floor/surface truncated by numerous cut features, post and stake holes, fire pit and tannūrs. No permanent stone structures are associated with any of these phases of activity. The surfaces within these phase can be broadly equated with those in Area IV to the south, based mainly on the stratigraphic sequence, similarities in deposit composition, and sometimes by levels.

#### *Sub-Phase 04a*

The earliest surface in this sub-phase is (2041), a light grey white sand and shell deposit, which can be broadly equated with (2296) to the south in Area IV. It extends across the area to the unexcavated Phase 03 structure Space 29, and probably underneath it toward the Phase 5 street (Space 3) to the north. It also continues beyond the eastern L.O.E and is eroded to the west.

This activity horizon was cut by 49 features that included; 5 fire pits, 1 tannūr and 43 post or stake holes. Amongst these was also an alignment of small rocks, suggesting a temporary structure. These features suggest that this area may have been the location for a temporary structure or tent, and recalls similar evidence found in ZUEP03 (see section 6.3). For ease of discussion these features have been divided into three groups. This division is based mainly on stratigraphic associations, but also spatial distribution or association. Two of these groups cut surface (2041) the third (group 03) cut some rubble and sand infill of the earlier phase below, above which (2041) had been eroded (Figure 6.2.25).

**Group 01** was located in the east of the excavation area. One of the main features of this group was a temporary structure, the footprint of a tent emplacement marked out with small loose beach stones in linear formation aligned NE-SW <2360> & <2362> (Figure 6.2.26). These were likely used to weigh down the walls of the tent. The structure was completely truncated to the north with only 1.10m remaining of its eastern and western boundaries. The southern wall (3.70m total width) was the location of a break in the stones and may be a possible location for an entrance. All the other features (postholes & fire pits) within the group may well be associated with this feature located just to the west and southwest of it.

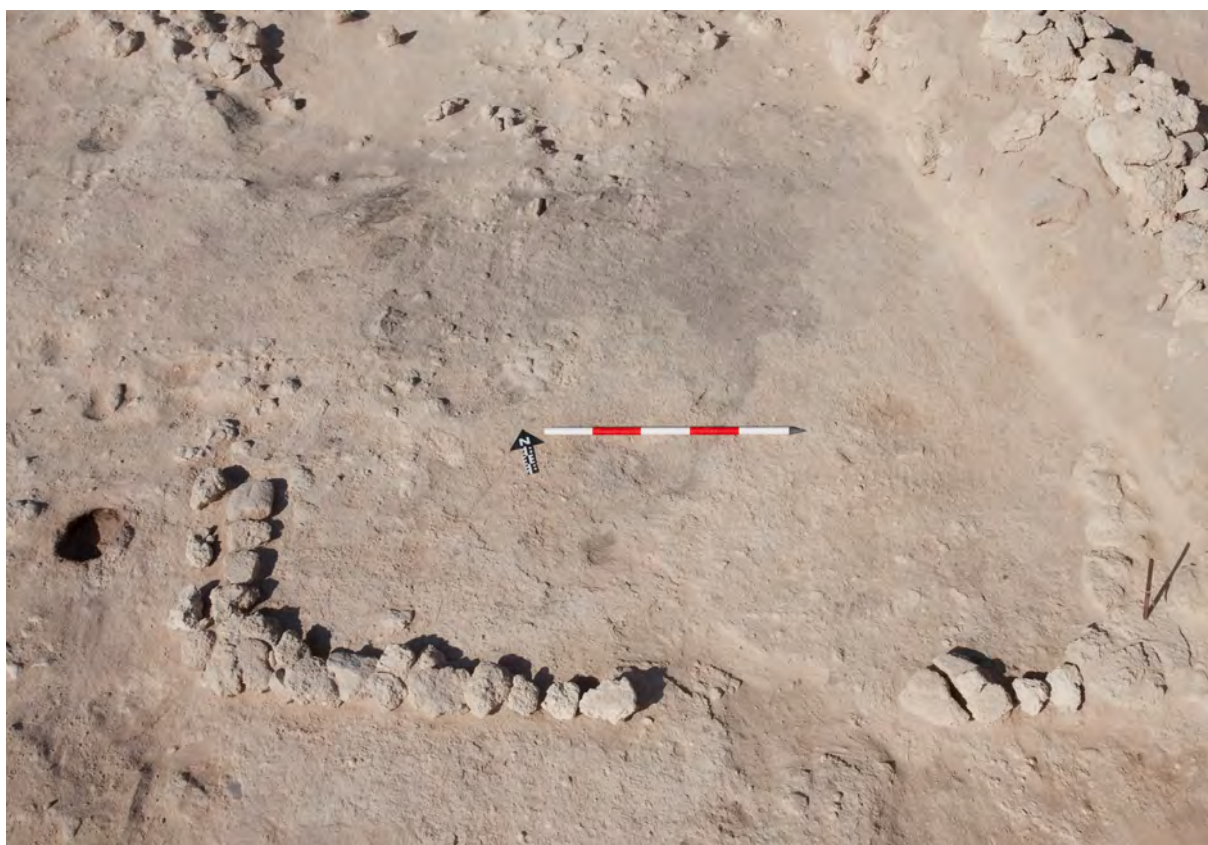
All of the 10 postholes in this group have a very similar homogenous sandy-silt backfill, deposited as a single event, which most likely occurred after the post was retrieved for reused. These posts form two clusters, the first of which covers an area less than 1m square and includes seven post holes in two NW-SE aligned rows of three (the first [2377]/(2369), [2378]/(2370), & [2381]/(2380), the second [2367]/(2366), [2376]/(2368), & [2379]/(2371)). The seventh posthole in the cluster was located 0.50m to the NE.

The second cluster of three postholes was located just 2m NE of the first and just 1m west of the temporary structure/camp ([2346]/(2345), [2348]/(2347) & [2351]/(2350)). All contained homogenous fills like the first cluster and all were very similar in form (0.18-0.20m in diameter, between 0.28-0.37m in depth with flat bases).





**Figure 6.2.25:** Post holes and tannurs cutting into activity horizon (2041) in sub-phase 04a



**Figure 6.2.26:** Flimsy temporary structure <2360> & <2362>

All of the fire pits were circular or sub-circular and contained one or two fills, rich in ash and charcoal. The first pit, loci [2356]/(2355) was cut into the backfill of posthole [2359], from the second cluster. The second, a largest fire pit [2373]/(2372)/(2365), may well be earlier than the temporary camp, as it is located directly in the path of where the western boundary <2360> would have extended, or it may have been located at the mouth of a second entrance. The third [2354]/(2353)/(2352) is located just to the west of the camp.

Traces of a second temporary structure or tent emplacement <2500> lie just 1.20m to the south of the first on roughly the same alignment NE-SW, but was not excavated.

**Group 02** – This is the largest of the groups with the most secure stratigraphic association. It consists of two fire pits, one *tannūr* and thirty postholes. A majority of these are located 6m west of the temporary camp and group 01.

A sub-rectangular *tannūr* was constructed in cut [2434], lined with flat beach stone (2433) filled with three *in-situ* deposits: (2442), (2441) and (2440). Just 0.40m north of the *tannūr* was a fire pit [2432] filled by (2431). This probably functioned with the *tannūr* and a group of four postholes [2418]/(2417), [2420]/(2419), [2422]/(2421) & [2424]/(2423). All the postholes were backfilled with a sand silt matrix with shell inclusions after the post was removed, and all were very shallow at 9cms depth or less. These may have carried a non-load bearing fence or windbreak associated with the *tannūr* and fire pit.

Located 3.50m SW of this cluster was a second fire pit [2447] consisting of a rectangular cut with its eastern terminus connecting with a N-S aligned (Phase 05) wall <2803/287>. The pit was filled with primary *in-situ* ash (2445) and a mixed back fill (2446). It is possible that a small group of shallow postholes [2459]/(2458), [2468]/(2467), [2451]/(2450), & [2217]/(2216) to the north may also have functioned as a windbreak for the fire pit.

Just to the north of this were two linear, roughly parallel rows of posts aligned N-S spread out over 2.50m. The two rows were approximately 1m apart. Coincidentally they are located either side of an earlier phase wall <2803>. The posts ranged in size from 0.14m -0.24m in diameter and all were quite deep, from 0.16m – 0.37m. The backfills were all sandy silt, with varying quantities of shell. The western row included four postholes running S-N [2449]/(2448), [2394]/(2393), [2457]/(2456) & [2455]/(2454). To the east, running S-N, were three postholes [2392]/(2391), [2390]/(2389) & [2388]/(2387). The depth the posts were inserted at may have some bearing on their function.

The last cluster of post and stake holes lay 1m to the south of the two linear rows. These twelve postholes appear to form a roughly square structure measuring 2m x 2m; once again all have had the posts removed and are backfilled with a sand silt, with shell and occasional charcoal inclusions. One of the posts was clearly hard to remove from the ground, with the retrieval pit [2397] being considerably larger than the post pipe [2398]. Both were backfilled at the same time with (2396). The other posts vary in size and depth and include [2414]/(2413), [2416]/(2415), [2411]/(2410), [2403]/(2402), [2405]/(2404), [2409]/(2408), [2427]/(2426), [2470]/(2469), [2180]/(2178), [2407]/(2406) & finally [2344]/(2239) a large deep posthole (0.30m x 0.30m x 0.35m) located slightly east of center within the structure.

**Group 03** - Three postholes [2465]/(2464), [2463]/(2462) & [2461]/(2460) cut through an earlier unexcavated rubble deposit (2653) visible in a sondage from 2009 season, were probable cut from this phase based on the depth of the cuts.

#### *Sub-Phase 04b*

A large percentage of the backfilled cut features in phase 04a were sealed below a resurfacing event (2106). This was cut by a group of three disparate postholes ([2235]/(2234), [2221]/(2219)/(2218) & [2172]/(2171)) with no obvious alignment or association, either cut or located close to the path of the earlier unexcavated N-S wall <2803>. This was directly superseded and truncated by a sub-circular *tannūr* [2170], which contained four *in-situ* fills (2166), (2148), (2146) and the final burning event (2145).

Located just 0.30m NW of this was a second circular *tannūr* [2090] which was lined with clay (2138), and filled with (2121) and (2119), as well as two mixed back fill deposits (2118) & (2115).

A final two individual postholes [2187]/(2186) & [2189]/(2188), both with no obvious associated features, were located 3m - 4m to the north of the *tannūrs* and did not cut surface (2106).

#### *Sub-phase 04c*

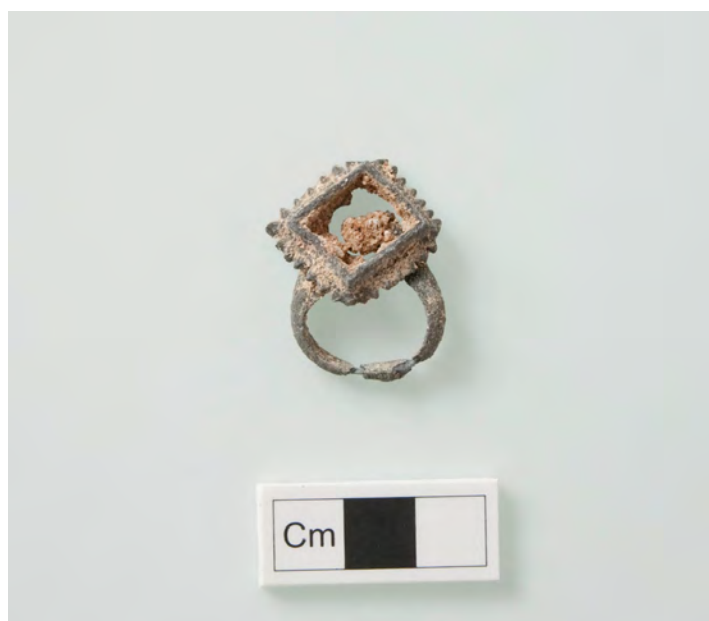
The latest surface in this sequence is made up of four separated and fragile patches of firm sandy silt and shell surfaces (2055) (2102) (2152) & (2244). Locus (2152) contained a rather fine finger ring (Figure 6.2.27). Cutting surface (2055), and directly superseding the *tannūrs* and posts from sub-phase 04b, was a group of three NE-SW aligned postholes [2072]/(2074)/(2073), [2081]/(2082) & [2083]/(2084) all backfilled with a generic homogenous sandy silt with shell. A fourth was located SE of the southern most post, so that overall they formed an L-shape. This fourth post was very different from the other three and may well have been a fire pit cut by a later posthole. The circular cut [2067] was filled or lined with locus (2100), which seems to be packing around the burnt remains of a post (2098). A later fire pit from this phase truncated the NE post [2072]. The oval fire pit [2067] was lined with a fired sandy silt, and included deposits (2066) and (2062), and a final abandonment backfill/leveling deposit (2053). All of this sequence was sealed below (2046) a sand and shell-leveling layer or construction horizon for the Phase 03 building Space 02.

To the east 4m from the limit of excavation were two fire pits [2185] and [2194], cut into surface (2152/2244). Both were sealed directly below the phase three structure Space 01 and its associated floors.

### ***Phase 03 – Beach stone compound and associated structures***

#### *Sub-Phase 03a – Construction*

Within this phase two small structures, Space 01 and Space 02, were established, followed by the construction of the large, beachstone compound wall. The two structures appear broadly contemporary since the construction styles are very similar, and both were built onto the same surface (2152).



**Figure 6.2.27:** Ring found in deposit (2152)

They were likely built at the same time as the rooms/Spaces 07 and 09 to the west, which also appear very similar in build.

Space 01 was located to the east of Space 02 and just south of the earlier Phase 05 street Space 03. The walls were constructed as a single event. This rectangular building is aligned WNW-ESE on its long axis, measuring 6.44m x 3.40m x 0.45-0.70m. The walls, <214>, <216> and <018>, were built of beach stone, roughly coursed, 4-5 courses high, and bound with light brown, compact sand and lime mortar. The inside faces were rendered in a similar plaster 3-5cm thick. Although fully visible in plan only the eastern end of the structure continued beyond the eastern L.O.E.. The only visible entrance to the space was located in the southern wall represented by the threshold <254> part of <018>.

Space 02 was located just over three meters to the west of Space 01. The main axis of this rectangular structure was orientated NNE-SSW, measuring 6.58m x 3.80m. The walls, like those of Space 01, were constructed as a single event, primarily of beachstone with occasional limestone and very rare black exotic volcanic stone. The walls were roughly coursed, and bound with a sandy lime mortar. The inner faces were covered with a shell mortar render with small chips of stone, which only survived at the base of the walls. The entrance to the space was in the SW corner in the western wall <034>.

To the South of Space 02, and abutting its southern wall <027> at the southeastern corner, was the eastern enclosing wall of the main compound <080>, which as aligned NE-SW and extended 17.45m to the south. This wall survived to a max height of 0.65m (4 courses) and was constructed mainly of beach stone, which was roughly coursed and lime mortar bound. This wall was only partially excavated this season stopping at the southern entrance to the compound threshold <066>.



Abutting the western wall <034> in Space 02 at the NE corner was the remains of a wall <2006>, which extended east 0.72m where it had been truncated. This may have been the original northern compound wall extending west to meet the southern wall of Space 08 <2659/087>.

#### *Sub-Phase 03b - Development*

After the construction of the walls of Spaces 001 & 002, the floors/surfaces were laid down, both internal and external. In Space 01 a single shell-floor locus (245) was laid down prior to abandonment, and to the south abutting wall <018> a very compact sand and shell external surface (2003) was laid down (Figure 6.2.28).

All of the internal surfaces were removed in Space 02 during last season. The survival of external surfaces was limited to locus (2004), a thin sliver of compact sand and shell with charcoal inclusions against the eastern wall <028>, and locus (2005) a very small patch of silt sand and shell surface to the west. It survived only in a corner created by the abutment of wall stub <2006>. This would have been the surface of the inner courtyard of this compound.

#### *Phase 02 – Late phase repairs and activity (dry stone or poor quality walls)*

Only a single event can be seen in this phase. Locus <2130> can be interpreted as a door blocking or collapse of the space leading through from the large central compound to the eastern structures Sp.021 through wall <080> in the SE corner of the compound.

#### *Phase 01 – Site wide Post Occupation/abandonment*

This is represented by two rubble spreads. Locus (2080) was located against the eastern L.O.E. just south of Space 01. This beach stone rubble dump mixed with sand, sloped away from the section E-W and is probably associated collapse for a wall located just beyond the L.O.E.. The second locus (2011) was associated collapse from the eastern compound wall <080>, located on the east side of the wall.

### **6.2.5 The Southeastern Area (Area IV)**

#### *Phase 05 - Plastered Beach & Limestone Architecture*

The three rooms excavated were aligned east to west along a street or road to the south of Space 28, which appears to run more or less parallel with the road to the north (Space 03; Figure 6.2.29). The southern wall of all three rooms makes up the northern wall of the street. All three rooms are linked through thresholds and appear to be part of the same building. Only Space 27, the far eastern room, has access onto the street to the south. The central room is accessed from either side and has a blocked entrance leading into a northern corridor (not yet excavated). This corridor appears to lead to another two partially exposed spaces, one to the north of Space 26 and a second north of Space 25. The latter appears to have an entrance in the northeast leading to an area currently sealed by later phase surfaces (Figure 6.2.30).



**Figure 6.2.28:** Shell surface in Space 01



**Figure 6.2.29:** Overview of Spaces 028, 027, 026 & 025





**Figure 6.2.30:** Overview of Sp. 025, 026, 027 & 028 looking west.



**Figure 6.2.31:** Detail of plastered basin positioned against wall <2475>

*Sub-Phase 05b: Development*

Excavations were conducted in only two of the spaces during this season to remove primary deposits. The earliest loci to be removed were locus (2437), a thick make up and resurfacing layer in Space 27, and locus (2384) to the south. This was a late phase patchy thin laminated silt and sand surface and bedding layer to the road/street of Space 28. The wall appears to have been reinforced/strengthened on the road side (south) with two very coarse builds <2486> & <2501>, which represents a major reworking of the entrance between these two spaces. Both were covered with a grey-brown gypsum plaster. Abutting these rebuilds was a new, but rough, threshold step made of beach stone and lime mortar <2444>. This step also covered the late phase floor (2437) in Space 27 which, along with the threshold, was sealed below (2429), the last make-up layer and resurfacing prior to abandonment. A ceramic spread (2430) consisting of 2-3 broken storage vessels was found lying on top of (2429) was found here, before the space was backfilled (Figure 6.2.30).

The primary deposits in Sp. 025 were not completely excavated. However, a small sondage was inserted near the entrance to Sp.026 to the west. This sondage showed that the space was initially covered with a hard, light grey gypsum plastered floor (2515), which was established at the same time the walls and thresholds were plastered. This was then sealed below (2514), a well preserved shell and sand surface covering the same area as its predecessor.

Although unexcavated the poor patchy survival of the primary *in-situ* floors/surfaces and makeup layers in Space 26 make stratigraphic speculation possible. The sequence appears similar to that of Space 25 to the east. Loci (2523/2522), a make up layer covering the entire space, is covered in the south of the space by a remnant patch of plaster surface (2516) connected to the wall plaster (2563) on the southern wall and the plaster (2517) on a curbed or lipped basin against the southern wall <2475>. The superstructure of this is not visible, but was most likely constructed above the make up layer (2523). At the center of the plastered basin is a tannūr [2519], which was lined with a mid red-dish brown fired silt (2518) and filled by a sandy ash (2891) (Figure 6.2.31). To the west face of the basin was a small hole, which may be some kind of flue for the tannūr. Just prior to abandonment or at the time of abandonment a cat died in the room, its articulated skeleton (2349) lay directly on floor (2521).

*Sub-Phase 05c: Post occupation/Abandonment*

The earliest deposit in this phase was locus (2383) covering the E-W aligned street Space 28. It contained a small amount of primary collapse consisting of beach stones and mortar from the walls either side of the street <2472> to the south and <2471> & <2475> to the north. This was mixed with laminated wind blown sands, suggesting slow decay over a period of time rather than quick demolition. This was sealed by locus (2382) (Figure 6.2.32) another mixed stone and sand deposit but this time with substantial quantities of stone mainly from the southern wall <2472>. This spilled through the entrance into Space 27 to the north. At this interface it was covered by locus (2361), which filled the entire room Space 27 onto the abandonment deposits and early floors, and continues east beyond the LoE. This layer (2361) contained a massive section of sheet collapse at the western end, at least 1.00m in length that had fallen in from the northern wall <2476>, and a huge triangular limestone anchor, which may have been incorporated into the build or dumped. As with a majority of the col-





**Figure 6.2.32:** Locus (2382) under excavation on the right



**Figure 6.2.33:** Detail of worked cowrie shells *in situ*

lapse/demolition deposits, this one was rather sterile. However, it did produced (against the southern wall) an assemblage of 17 worked cowrie shells (Figure 6.2.33), the tops cut flat so they could be attached to textiles, worn as jewelry or as horse livery. Three more were retrieved from the dry sieve.

At the threshold to Sp.025 the deposit (2361) was covered slightly by (2333) which filled all of Sp.025 & 026 to the west, this was very comparable in make up to both (2382) & (2361), but contained a sizeable amount of large fragmented wall plaster, which represents collapse from the walls of Sp.025 and 0.26, particularly around the two entrances. This was covered by a leveling deposit (2334), upon which the early floor (2296) of Phase 04a was laid.

#### *Phase 04 - Intermediate Open area, with temporary structures*

This phase has two clear sub-phases in the SE area, both consisting of a large expanse of external surface cut by numerous small pits, *tannūrs* and post or stake holes. The only stone structure to function within both phases was the *madabes* or date press room Space 11.

##### *Sub-phase 04a*

The phase begins with the construction of a rudimentary drainage system <2337> using the stone infill/leveling of the earlier Phase 05. This was sealed by an expansive silty sand make up layer and compact surface locus (2296). The floor/surface contained low densities of the usual material culture (ceramic, bone, glass and Fe metal nails), but also a (Fe) roundshot cannon ball (Figure 6.2.34). Taking into account its current weight and state of corrosion this likely represents the remains of a standard 12-pound caliber, as was common on many naval vessels throughout the 18<sup>th</sup> and early 19<sup>th</sup> century up until the invention of shells.

This external surface was by no means a 'dead space'; it was a large activity horizon cut by sixteen features, nine driven post/stake holes, one *tannūr*, one fire pit, a bitumen mixing pit and four either burnt postholes or small fire pits. All the cut features were located in the southern half of the surface and were aligned approximately east to west possibly in two rough parallel rows (6.2.35).

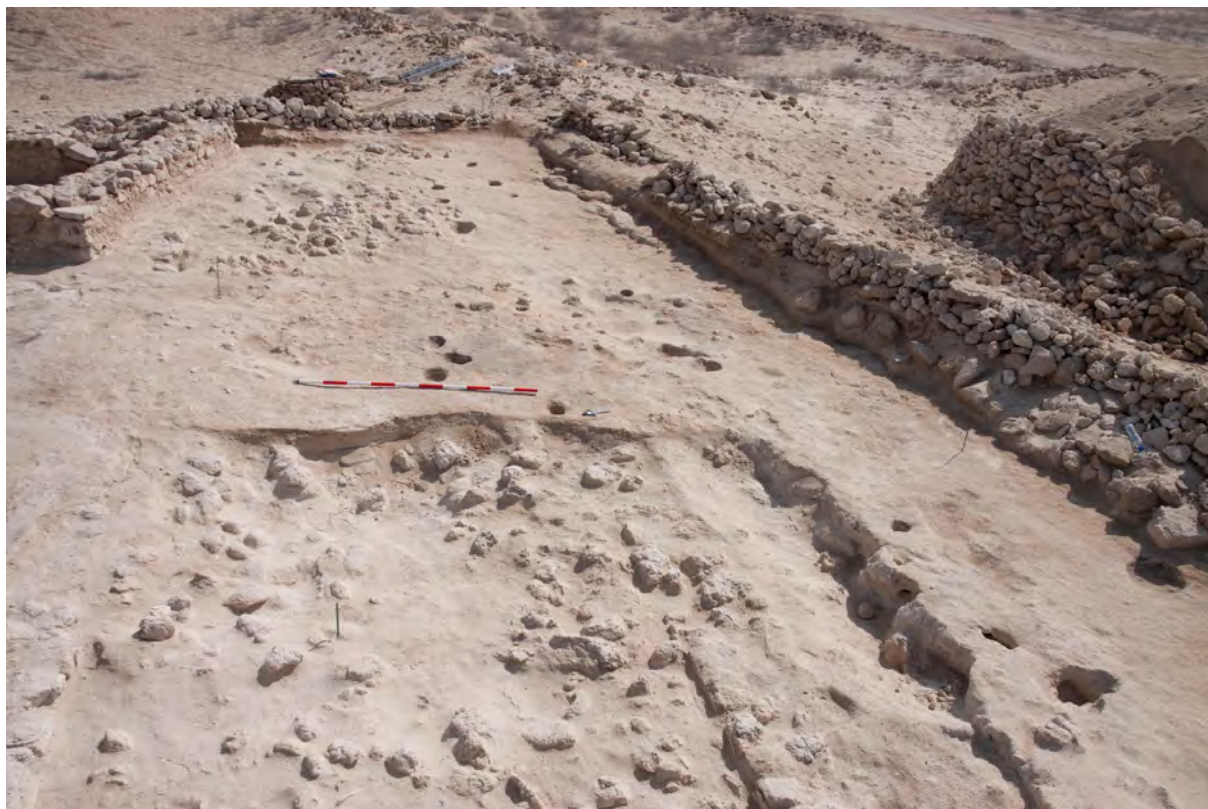
The surface had many localized burnt patches, making the interpretation of some of the features difficult. Due to this some of the shallow flat-based postholes containing sand and ash fills have also been tagged as possible small fire pits. These include (2292)[2293], (2294)[2295], (2310)[2311] & (2312)[2313]. The *tannūr* was located roughly central to the exposed surface and was constructed in a sub-squared cut [2326] which was lined with thin selected lime stone slabs (2324). The primary fill was a silty ash with common charcoal flecks. The secondary fill was locus (2322), an ash-sand mix containing common oyster shell fragments and charcoal flecks, as well as some collapse from the edges of the *tannūr* (Figure 6.2.36).

At the southwestern limit of the surface where it was eroded away, two possibly linked features were located. The first was locus [2291] a small circular fire pit. The pit was filled with a now solid block of bitumen (2385); this tar like substance was full of small voids as well as wood chips and charcoal. This was used to create watertight structures and as such could have been used for the treatment or preparation of boat hulls or for the treatment of roofs. The group of post or driven stake holes (2320)





**Figure 6.2.34:** *In-situ* cannon ball



**Figure 6.2.35:** Multiple features cutting external space in sub-phase 04a





Figure 6.2.36: Tannūr [2326]



Figure 6.2.37: Space 11 with *madabes*



[2321], (2318)[2319], (2316)[2317], (2314)[2315], (2306)[2307], (2303)[2304], (2300)[2301] & (2298)[2299] could have a myriad of functions.

This phase also saw the construction of the *madabes* Space 11 (Figure 6.2.37) orientated NE-SW (6.50m x 4.00m). The room consisted of four well constructed walls <2156>, <2157>, <2158> & <2159>, built using primarily beachstone with occasional limestone and rare flint cobbles. All were bonded and part of a single construction event, with a grey brown sand and shell lime mortar. They were roughly coursed and rubble built with well-selected stone and survived to a height of between 4 -7 courses. The faces had evidence of mortar render both inside and out. The only entrance to the space was at the SE corner of the eastern wall <2156>.

Due to the structures preservation *in-situ* the internal floors and structures have not been fully excavated or understood. The date press was located at the northern end of the room and consisted of a ridge and furrow superstructure constructed with rubble and mortar covered by (2109), a light gray hard gypsum plaster. Streaks left by the fingers of those applying the plaster could still be seen imprinted in it (Figure 6.2.38). A container, set into the floor and used to collect the date juice, was not found. The southern end of the space was covered with a compact silt floor (2222), cut by a possible *tannūr* or fire pit. This structure (Space 11) continued to function in some capacity right up to the time of site wide abandonment.



**Figure 6.2.38:** Detail of *madabes* in Sp. 011 showing finger and hand marks in the plaster

### *Sub-phase 4b*

This phase is marked by the introduction of a major resurfacing of the large open area to the south and west of Space 11, which is abutted by a new surface. This external surface (2276), like its predecessor, suffered from erosion to the north and west, but can at least broadly be equated to some of the deposits excavated in Area III to the north. In the south it continues beyond the L.O.E.. The surface comprised slightly silty sand with common shell inclusions and fragments of crushed masonry, and scarce charcoal flecks. The usual cultural material was present, but in lower densities. The surface sealed all of the earlier cut features, but was like the earlier surface an area of activity, which was cut by eight post/stake holes most located immediately south of Space 11, a single fire pit [2287] and posthole [2285] just over 5m to the west, in an area where the surface was highly burnt.

The first group of postholes was aligned E-W and evenly spaced. They include (2266)[2267], (2260)[2261], (2256)[2257], (2282)[2283] and (2262)[2263], which was later cut and replaced by (2264)[2265]. The backfills of most of these consists of loose sands or sandy silts with shell and occasional charcoal flecks, and is the product of post retrieval and collapse from the surrounding makeup and surface. Another two postholes extend to the north forming a rough L-shape with the E-W run, (2258)[2259] & (2280)[2281], which was located on the SE corner of Sp.011. They enclose a remnant patch of sand and shell surface/floor (2255). Together they represent the remnants of a temporary structure, such as a tent, hut or simple enclosure.

In the north central area the surface was covered by locus (2254) a patch of very soft, mid orangish brown, highly organic material that represents the remains of a decayed timber feature. This was sealed below a sand and shell exterior surface (2230/2251) replacing the eroded earlier surface. This became the construction horizon for the eastern structural group Space 19 and 21.

### *Phase 03 – Beach stone compound and associated structures*

The phase is represented by two distinct groups of structures, the first referred to in the 2009 season as the Eastern Structure, was mostly excavated (internally) then, with the exception of the walls a few internal deposits and all the associated external surfaces and walls. This group of structures located to the SE of the main compound was more than likely once an eastern extension to the compound with access into the first of the rooms Sp.021, the walls of which would have abutted the eastern wall of the compound <080>. This relationship was removed by the robbing of stones from the walls and a massive truncation running alongside the compound wall (excavated 2009 season) that cut deep enough to truncate some of the Phase 05 architecture below. To the NE of Sp.021 was a smaller room Sp.019, which appears contemporary with Sp.021. Together they form an inverted L-shape Aligned NE –SW. The final associated space (Sp. 020) appears to be a later addition to the group.

The second group of structures lies only 2m to the east of Space 19, separated by a small corridor/access that was later blocked off. These two structures developed around an earlier Phase 04 room (Space 11). Space 17 was added to the south and Space 29 was constructed on the northwest corner of Space 11 extending to the northwest.

This phase has three sub-phases in the Southeastern area; Sub-phase 03a construction, Sub-phase 03b development, and Sub-phase 03c post occupation/abandonment.

### *Sub-Phase 03a – Construction*

All the walls constructed in this phase were built directly on leveled construction horizons formed with the demolition/collapse from the earlier phase, none were constructed within foundation cuts.

Extending 5.65m SW and utilizing the existing southern wall of Space 11 as its northern limit, Space 017's three walls (<2160>, <2161> & <2162>) were constructed in a single build. The walls were constructed primarily with beach stone, roughly coursed using a sandy lime mortar. The walls survived to a maximum of three courses, only where they abutted the southern wall of Space 11 (Figure 6.2.39).

The construction of Spaces 19 and 21 is hard to gauge, as the wall survival is so poor. What is clear is that both northern walls were reworked, with both being distinct from their southern and eastern counterparts in both spaces.

The eastern and southern walls (<305> & <2252>) of Space 21 appear to be the earliest and are part of the same build event. Only a single course remains with large flat beach stone and lime stone blocks bound with a sand lime mortar and set on a mortar bed. The southern wall <2252> is heavily truncated to the west, by a later robbing/pitting incident, which was excavated during the 2009 season. There are no visible entrances to this space or into Space 19.

The southern and eastern walls (<307> & <2165>) of Sp. 019 like those of 021 appear to be the earliest. It is unclear whether the southern wall was bonded to or abutted the eastern wall of Space 20 due to poor survival, although the smaller stones in the build of <307> would suggest an abutment making Space 19 later than 21.

The walls of the small room (Space 29) to the northwest of the date processing room (Space 11) have yet to be excavated. The survival once again is very poor with only a single course or two surviving, and the structure having been truncated in the NE corner. The rubble built walls appear to abut the NW corner of Sp.011, strangely incorporating a very small portion of that structure into the build. This relationship requires closer examination next season.

### *Sub-phase 03b – Development*

All the development in this phase occurred around the already existing structure Space 11, although it did not remain static. Its original function as a date processing room was altered. The distinctive ridge and furrow plaster and stone structure (2222) at the southern end was back filled and a new surface established across the whole space (2101). The new surface was cut in the SE corner by a ceramic-lined *tannūr* [2890], which was filled with pure ash (2103). A build up of ash and sand (2093) around the *tannūr* has been placed higher up the matrix (Phase 01) based on its tentative relationship with the door blocking as post occupation dumping. This may however represent a phase of occupation build up of rake out deposits mixed with sand.

Sealed below the later northern wall the repair/rebuild <301> of Space 19, was a truncated (excavations 2009 season) sequence of deposits. This small yet perfectly formed sequence not only provided information about the rooms form and function but also about its demise. According to last seasons report the rebuilt wall <301> had no associated floors/surfaces, although the proximity to the surface may mean they did not survive.





**Figure 6.2.39:** Space 17



**Figure 6.2.40:** View of Space 19 showing the thick burnt layer (2215).





**Figure 6.2.41:** Detail of character of burnt deposit (2215).



**Figure 6.2.42:** Detail of palm and roof purling in the burnt deposit (2215).



The earliest and only floor/surface associated with the original walls of Space 19, was locus (2215) (Figure 6.2.40) a thick layer of highly burnt sand and shell (50%/50%). This floor was truncated to the south and was covered with burnt *in-situ* remains, mainly botanical including: large quantities of burnt date seeds (Figure 6.2.41), charred wood, burnt fabric (sacking) and cord, some textile (matting), and some possible paper fragments. The large quantities of fish bone and other faunal remains could indicate that the function of the room was for food storage, including perhaps the drying of meat/fish, and storage of dates. The buildings northern wall was heavily damaged by this fire event hence the necessity of the rebuild <301>. This mirrors similar damage by fire encountered in ZUEP01 (see section 6.1), which may suggest a sudden, catastrophic event of settlement burning. This can tentatively be related to the 1811 attack on Zubārah by Omani forces as part of anti-piracy campaigns in the Gulf region (for discussion see section 2.1 and 2.2).

In the northeastern corner the floor was covered by burnt roof and wall collapse (2214), which was then sealed by a second more extensive layer (2204) of well preserved burnt roofing material including burnt woven palm, burnt wooden roof purlings, and fired mud/mortar (Figure 6.2.42). The latest in the sequence was locus (2203) a mixture of ash and sand, degraded collapse associated with (2204) the locus below.

In Space 17 only a single very patchy surface/floor (2114) was present above the walls. Although at present it is unexcavated this would appear to be the same with the shell surface (2557) in Space 29.

One of the latest structural additions during this phase was that of Space 20. Prior to its construction a leveling deposit of sand mixed with small to medium fragments of beach & lime stone (2183), was laid down. This abutted the walls of Space 19 to the north. Above this were two external floor/surfaces (2223) a small patch against the eastern wall of Space 19 and (2238) a large spread abutting the western wall of Space 17.

Constructed above these surfaces were two walls, <302> forming the eastern limit of the space and <303> the southern. In comparison to the walls of the other two rooms in this group these later additions were poorly constructed. These walls clearly abutted the well-constructed walls of the Space 19 to the north and Space 21 to the west, to form a courtyard or enclosure. Due to the poor height survival of the walls, access to this newly formed space is not clear, although the eastern wall <305> of Space 21 did have a stone door socket about half way along its length. This however looks to have been a reused structural element in the walls construction rather than *in-situ*.

Abutting the eastern wall was a single sand and shell surface (2182), sealed below the Phase 01 rubble collapse (2181). Two small remnant patches of external surface (2226) and (2224) located between Spaces 017 and 020 most likely functioned with this additional extension to the Eastern structures. These loci are most likely part of the same surfacing event as locus (2225) to the north of Sp.019.

#### *Sub-phase 03c – post occupation abandonment*

Most of the structures that developed during this phase were never superseded or any indication of later development was removed completely. As such, most of the abandonment deposits are placed in Phase 01. The only structure to be completely demolished, leveled and replaced was Space 17, filled

inside and out with deposits (2108), (2177) & (2122) before being built on again. Leveling layer (2108) was also cut by a single posthole [2111] filled with (2110).

*Phase 02 – Late phase repairs and activity (dry stone or poor quality walls)*

This phase in the SE is represented by four walls; the first was <2116> a partial single course, rubble built beach stonewall (3.50m x 0.86m x 0.20m) located above the eastern wall of Space 17. The wall was aligned N-S unlike the other structures associated with the earlier Phase 03 which were aligned NE-SW. This wall was obviously part of a larger structure no longer present (Figure 6.2.43).

The second feature a very coarse dry-stone wall <301>, was recorded last season as the northern wall of Space 19. It turned out that this was in fact a poor rebuild and that the original northern wall <2229> lay 0.40m to the north obscured by Phase 01 collapse. This abutted another rebuild locus <2229> to the northern wall of Space 21. This wall was originally believed to be a western extension of <301>, however, the build style was clearly different. These rebuilds may well have been coupled with the construction of locus <2163> a NW-SE orientated wall roughly inline with <301> and <2229> to the west. This new wall effectively blocked the through space between the eastern structures and the date processing room and associated structures.



**Figure 6.2.43:** Wall <2116> belonging to Phase 2

### *Phase 01 – Site wide Post Occupation/abandonment*

As can be expected this phase consists of a series of deposits linked to site wide degradation, within and outside of the latest phase structures. These deposits consist predominantly of beach stone rubble, mortar and wind blown sands they include:

*Loci (2289) filling Sp. 029 and (2154) located externally to the east.*

The long-lived structure containing the *madabe* (Space 11) appears to have been abandoned with a deliberate infilling/blocking (2227) of the only entrance. It then appears to have been used as a waste dumping area. The blocking event appears to have been sealed by a finds rich layer (2093) of mixed sand and ash dumps. The finds included the usual mix of cultural material found on site as well as two coins, two stone tools and two fishing weights or anchors. This relationship was very tentative and the thick ash deposit (2093) may well be an occupation build-up relating to a functioning space. This was sealed below the upper fill (2075) of demolished or deflated beach stone and mortar walls mixed with sand.

A majority of the infill was removed from Space 19 and 20 during last season's excavations. A small amount of wall collapse (2181) that was left in Space 20, believed to have been part of the eastern wall, was removed this season, to expose the remnant floor below. A large spread of external collapse or dump (2142) was removed in the area to the south of Space 20 and east of Space 05, and the equivalent deposit (2132) to the east of Space 19 and 20.

North & northeast of Spaces 21 and 19 was (2209), a burnt ash spread (post occupation dumping), as well as two mixed, sand rubble spreads (2141) and (2151). These were sealed by (2097), another mixed rubble and sand spread, partially filling the north of Space 19 and covering wall <301> and the external area to the west of Space 11.

### **6.2.6 ZUEP02 - Phase Summary**

**Phase 01** (Most recent) – Site wide abandonment. This latest phase relates to a period of post occupation and collapse mixed with windblown sands. It was represented by a series of large deposits primarily of beach stone rubble associated with deflation of the walls of the beach stone compound and associated structures and the later phase repairs to these structures (Phases 02 & 03).

**Phase 02** – a minor build phase at the end of the settlement's life, salvaging decaying structures, most of the activity within this phase would suggest that limited settlement activity took place.

**Phase 03** – marks the second major phase of architectural development. Several of the buildings during this period were terminated by fire. This could be linked to one of the historical sackings of Al Zubārah. The compound appears to have developed around Spaces 07 in the west and 09 in the northwest; these appear to be broadly contemporary with the large building 005 to the south and Sp. 02 and possibly 01 to the east.

Later the gaps between Space 07 and Space 09 to the north, and Space 05 to the south were closed off forming two small rooms Space 33 and 010 respectively. Also Space 08 was added to the east of Space 09 and the space between the southeast corner of Space 09 and the northwest corner of Space



02 closed off with wall <2006>. It is possible that there was an entrance to the compound here. In conjunction with these later developments the long Eastern wall <080> was also constructed effectively closing the compound. Later still we see the construction of the three spaces to the southeast of the compound, Spaces 19 and 21 with the later addition of Space 20 a possible small courtyard. Two additional structures were also constructed abutting the Phase 04 structure (the date processing room) Space 29 to the northwest and Space 17 to the south.

To the west of the compound a structure, formed of two Spaces 22 and 23, was constructed with hard wearing metallised surfaces, most likely linked to some industrial process. It is still unclear how the northeastern structures Spaces 12 and 13 fit within this development as the buildings alignment appears more in keeping with that of the earlier Phase 5 architecture. The phasing here may have to be reviewed next season.

Unlike the earlier architectural Phase 05, which was well planed and constructed, this development appears more an *ad hoc*, piecemeal development with inferior quality materials and may represent an economic down turn, ending catastrophically in structures 02, 07, 22, and 19 all being gutted by fire.

**Phase 04** – With the exception of one stone structure (Space 11) this phase appears to represent an intermediate phase between two major architectural phases. Despite the lack of stone structures this phase was by no means static. There were at least three major resurfacing events, as well as several minor localized repairs. Numerous pits, post and stake holes, fire pits and tannūrs cut all of these surfaces. These represent the remnants of temporary structures, such as tents or palm leaf huts, which denote a more ephemeral phase of settlement at Zubārah.

**Phase 05** – Is the first major architectural development within the ZUEP02 area of excavation and is what looks like a golden time within the settlement. Walls were well constructed using both beach stones and lime stone with lime mortar. All of the walls were rendered and plastered with a hard light grey brown gypsum plaster. The town appears to have been well planed with good lines of communication through arterial streets leading toward the beach. While some structures appear to have had a residential/ domestic purpose, others appear to be characterized by commercial and craft activities.

In Space 27 and 28 late floors surfaces, repairs to the entrance, partial collapse and reuse may indicate the settlements economic struggle prior to abandonment.

## 6.2.7 Conclusions and Recommendations

The archaeology encountered in ZUEP02 is certainly the most complex yet documented stratigraphy in Al Zubārah. If anything, it shows that this area appears to have been intensively used throughout the settlement's life-history. It has also unfortunately meant that our work in ZUEP02 is far from complete. The complex stratigraphy evident in the excavations will require much further work to be untangled to reach a full understanding of the different phases.

The work to date has shown that throughout the history of Al Zubārah was used for different purposes, many of which had connections to maritime life. Later phases reflect the activities of fishermen and pearl divers, as suggested by the discovery of diving weights and anchors. More ephemeral settlement and occupation is suggested by the presence of tents and/ or huts during Phase 4, as attested

to by numerous postholes, *tannūrs* and stone alignments. In the earliest yet documented occupation of Phase 05, we find both domestic and household, as well as what appears to be commercial activities taking place in ZUEP02 at this time. The three rooms north of the east-west running road (Space 03) certainly appear to be shop fronts, while some of the sediments in this area suggest that some kind of industrial or production process (perhaps of glass or metal) took place in this area. Given the proximity of this zone to the *suq* to the north this certainly requires further investigation. The newly discovered road or alleyway to the south provides an important insight into the layout of streets and neighborhoods at Zubārah. Importantly, these seem to relate to Phase 05, which we understand to be the main phase of settlement.

Not all of our aims were achieved this season. We have reconciled a lot of the phasing from disconnected excavation areas from last season, however, the two seasons of ZUEP02 have not yet been linked in a single stratigraphic matrix. We are definitely getting a better picture of the earlier phases (05 and 04) activity and layout through removal of the later structures. All the phase 01 and 02 structures and collapse deposits have now been removed. Next season the focus will be on trying to remove the remainder of the phase 03 architecture, and expose more of the phase 05 settlement in plan, this process is already well advance in the northeast and southeast.

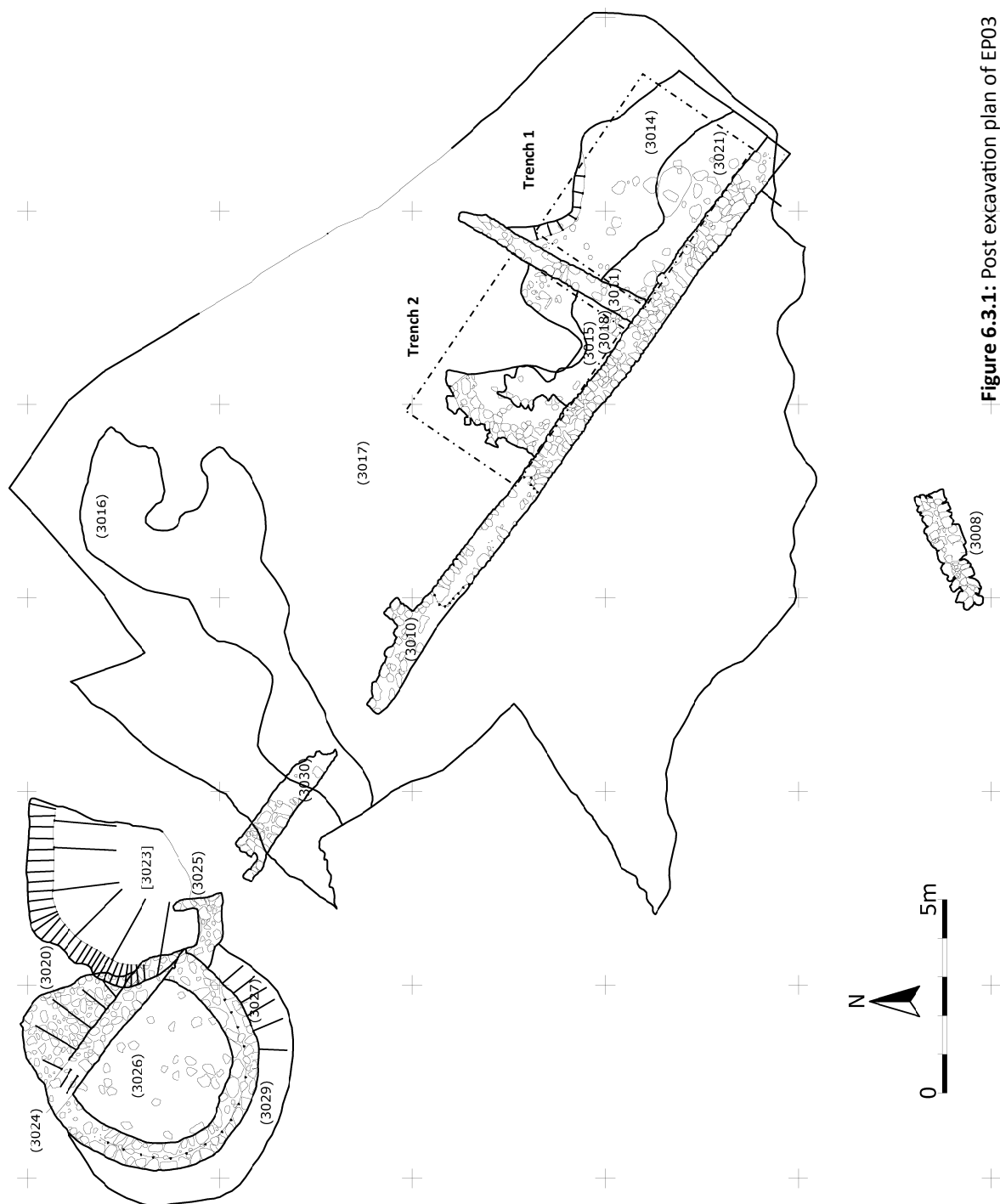
## 6.3 EXCAVATION POINT THREE

*Tom Collie*

### 6.3.1 Introduction

Excavation Point Three (EP03) was situated around the area of Tower 11 on the inner city wall and encompassed the extant remains of the tower, road and the inner city wall itself (Figure 6.3.1). It spanned an area of 30m x 35m with the south-western corner located at 180630E/468870N. Primarily, the first objective of this area was to reveal the nature of Tower 11 and demonstrate any possible differences with Tower 5, which was excavated last season at ZUEP01 (Bille 2009; and Section 6.1). Initial ideas regarded the building as either some form of coastal defence or a gate-house structure to monitor traffic into and out of Al Zubārah. Investigations here aimed to test these ideas (Section 3.2.3). Objectives two and three involved the road and inner-city wall respectively. Excavation aimed to determine whether the road leading from the pier to the south was contemporary with any phase of town occupation. If this was the case, then the excavation here could be used to inadvertently date the pier, which was linked to the road. It would also demonstrate whether the road was linked to the settlement or whether it was added after Al Zubārah was abandoned. These primary objectives were coupled with a general secondary aim of characterising the area as a whole. Two 5m x 2m deep soundings were excavated in order to reveal deep archaeological stratigraphy and aimed to gain a small, but detailed, picture of the activities that had occurred in this area.

The archaeology found from achieving these objectives was divided into six phases. Phases 6 and 5 were evident only within deep soundings. Phase 6 contained irregular and fairly well established layers of undulating sand overlying and also underlying thin layers of occupational debris. Phase 5 represented a regular, and indeed intense, period of activity, possibly indicating the emergence of an area holding semi-permanent or indeed permanent beach camp activity. Phase 4 displayed serious occupation activity associated with beach camps or seasonal settlements prior to the building of the wall. This phase was seen evident in site-wide deposits as well as within the two evaluation trenches and represents an almost permanent area of intense activity. These layers represented possible beach camp activity that was laid down irregularly through time in an area that was desirable for camping but was not used frequently. In general, Phases 6 through to 4 show the emergence of an area that grows popular over time to the extent that possible beach camps turn to almost permanent places of residence. The third phase included archaeological deposits lying beneath the Al Zubārah inner town wall, indicating a period of abandonment or indeed lack of architectural construction. The second contained building features pertaining to the later settlement of Al Zubārah where the town shrank behind the inner city wall. This phase included the tower and the inner-city wall, along with subsequent dilapidation and demolition deposits. The first and last phase contained modern overburden layers, modern windblown sand and the road leading from the pier.



**Figure 6.3.1:** Post excavation plan of EP03



### 6.3.2 Phase 6

Even though ZUEP04 was not excavated down to natural in its entirety, the evaluation trenches provided an insight into the development and history of this area. Phases 6 through to 4 includes discussions on the deposits found primarily within the trenches, with the exception of Phase 4 and deposit (3028). Each phase was divided into groups of deposits indicating related sets of features and activities.

Phase 6 represented the first period of activity in this area. It differed from Phase 5 in that the deposits within, especially the occupation deposits, were less uniform and regular than those laid down on top. In section profile, they fluctuate and undulate in height indicating that the surface on which they were placed was irregular (Figures 6.3.2-6.3.5). As opposed to renewed and prepared surfaces evident further up in the archaeological stratigraphy, sandy beach deposits were utilised as they were naturally found. This phase represents the beginning of the utilisation of this area Al Zubārah's inhabitants where beach surfaces were irregular and where deliberate occupation and activity was sporadic.

Trench 1 shows most activity from this phase and the deposits therein were divided into 5 groups, each group representing a period of activity.

#### *Group 1*

The first group included natural sand deposits, representing the natural beach surface. The natural sand deposits (3184-5) were evident at 0.33m above sea level in the south east end of Trench 2, slumping to 0.16m above sea level in the northwest. On top of these deposits was evidence of occupation consisting of thin grey/brown lenses of sand and shell which contained charcoal, pot and bone (loci 3178-9, 3180, 3183 & 3330-2). These sequences were similar in Trench 1 where deposit (3248) (seen as equal to (3183) in section) contained a small copper coin, ideally dating the very early sequences of the stratigraphy. Beneath this lay (3249), the deposit representing natural sands and equal to (3184). The shells of gastropods extant in the sand deposits of the lower horizons were sampled for radiocarbon dating to provide a proxy date for the formation of the sediments at this level. Shells were taken from Loci (3178), (3179) and (3183) from Trench 1, representing the lowermost deposits in this area close to the sea water table (see Figure 6.3.2). Although the two samples from (3178) and (3183) (WK-28177 & WK-28179) did not produce any results, the sample from (3179) produced a date of 255 +/-30 bp or 287 +/-124 cal BP (1663 +/-124 cal A.D.) (WK-28178). This suggests that the lowermost beach horizons in this trench were deposited in the post-medieval period, likely during the 17th century AD. This provides a rough *terminus ante quem* for the occupation in this area, which is unlikely to predate 17th or 16th century. For the material culture from this trench this provides at least a rough proxy date.

#### *Group 2*

The second set began with an occupation surface of white sand (3177) covered with a patch of charcoal (3175) and varying lenses of grey-brown sand and shell (see loci 3333-42, 3174-5). Two archaeological features of note occurred within this group, namely an oblong post-hole, possibly relating to a collapsed post [3173], and a small pit [3182]. There was no *in situ* burning within this pit to suggest

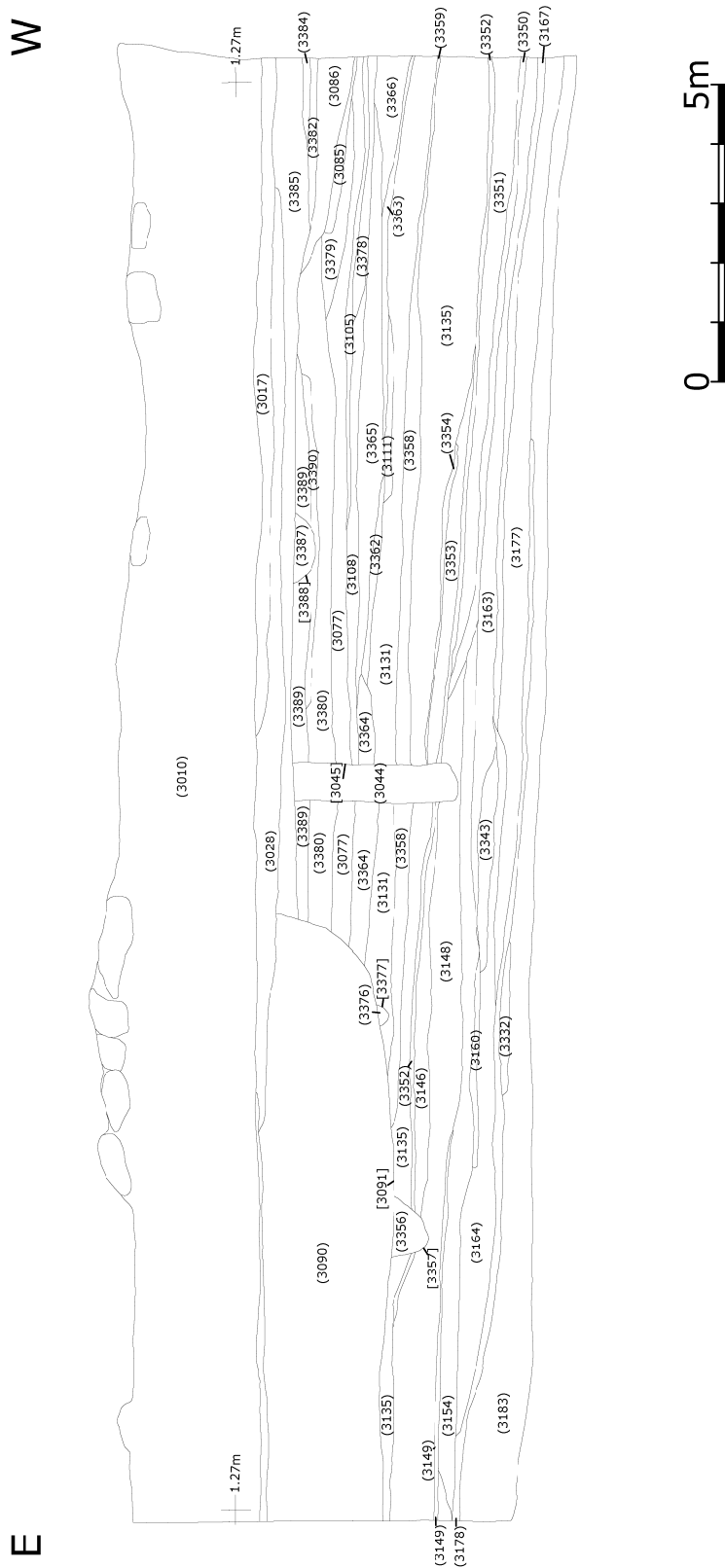


Figure 6.3.2: South section in Trench 1

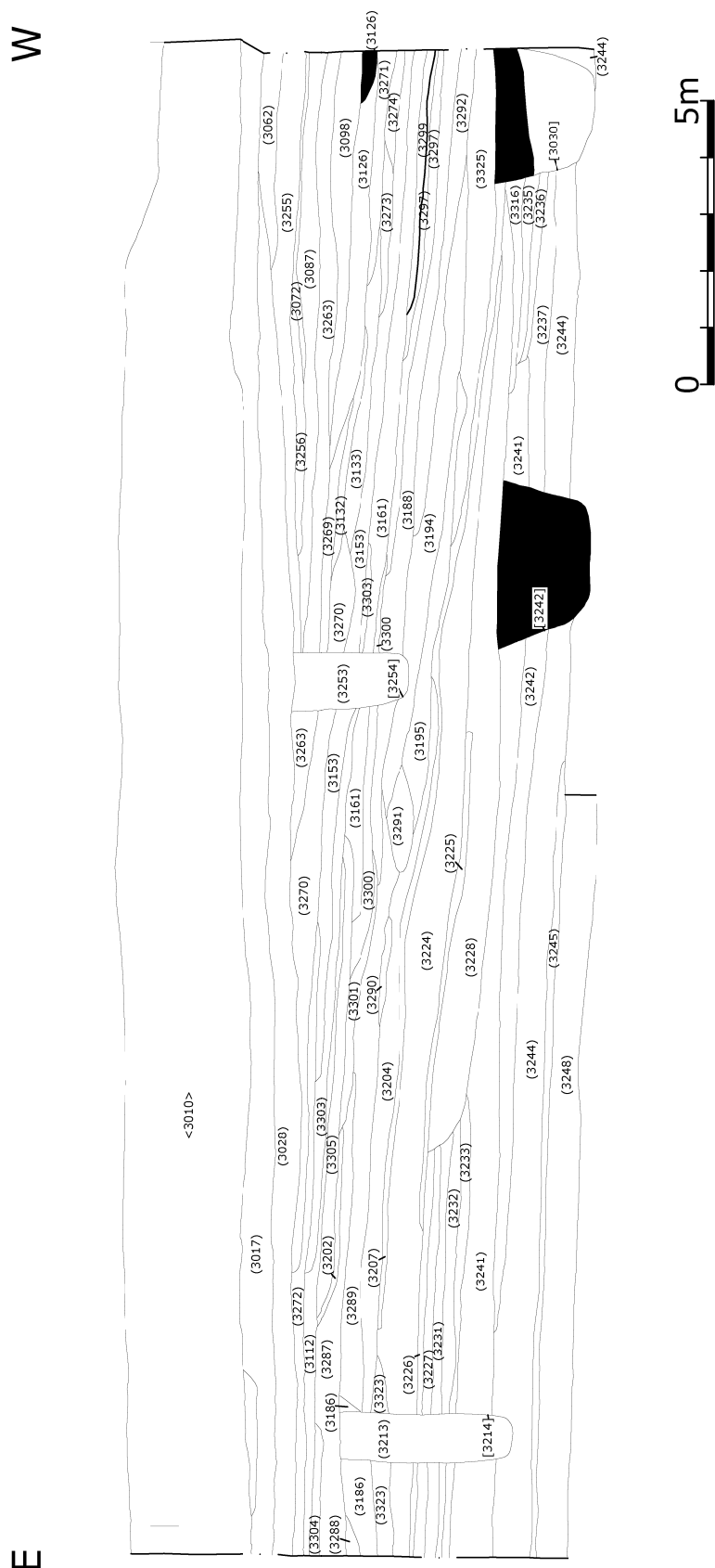


Figure 6.3.3: Southern section in Trench 2

the presence of a camp fire. There was enough pot and animal bone to suggest it was dug as a rubbish pit. These features were in turn covered by a fairly extensive occupation layer of dark grey brown charcoal-rich sand (3167) and also patches of grey shelly sand (loci 3163-4 & 3343).

### ***Group 3***

The third group displayed a similar sequence. Coarse sandy shell layers acted as occupation surfaces (loci 3158-60 & 3162) which were covered by varying brown/grey layers of sand and shell (see loci 3345-57).

### ***Group 4***

The fourth group held no archaeological features of interest, only deposits following the same sequence as already previously described. An extensive brown yellow sand layer (3148) covered the entire trench and was overlaid by shell deposits (3146 & 3149) as well as occupation deposits (loci 3350-5). These deposits were similar to those in Trench 2 (see loci, 3310, 3237, 3242-5) especially (3243), equal to (3350) in Trench 1.

### ***Group 5***

Trench 1 contained an occupation surface (3135 – equal to 3241 in Trench 2) consisting of a light brown yellow, sandy layer which covered the entire trench. Onto this were placed occupation deposits (3134, 3160-1), three post holes [3137-40 & 3145] and a fire pit [3142]. In Trench 2, shell deposits (3227, 3231-3) and white sand (3241) combined to form an occupation surface on top of which occupation deposits were situated (loci, 3225-6, 3228, 3235-6, 3238, 3311-3316, 3326). Occupation surface (3241) was truncated by gully [3240], which ran directly across the trench, perpendicular to its edge, and was clearly below the level of the water-table. It seems that this feature was a predecessor to gully [3230] (Figure 6.3.4). The fact that this feature was consequently replaced by an exact replica in Phase 5 indicates the very beginning of the continued use and reuse of this area. It has been suggested that this gully may have been a drip-gully for a tent or indeed drainage for this area. Sadly the limitations of the trench did not provide a complete answer.

## **6.3.3 Phase 5**

Phase 5 was characterised by more numerous archaeological features, as well as deposits that were less irregular and undulating than those seen in the previous phase. Phase 5 demonstrates that this area was changing from a sporadically used beach front to a more regularly occupied zone. The deposits contained within it were divided into 2 groups.

### ***Group 1***

In Trench 1, the first group of deposits lay on top of a surface renewal deposit (3358-9 – equable to 3328 in Trench 2). This small group of deposits established a trend for the sequences seen in both trenches. A surface was laid down and then a deposit rich in material finds was deposited. A renewal

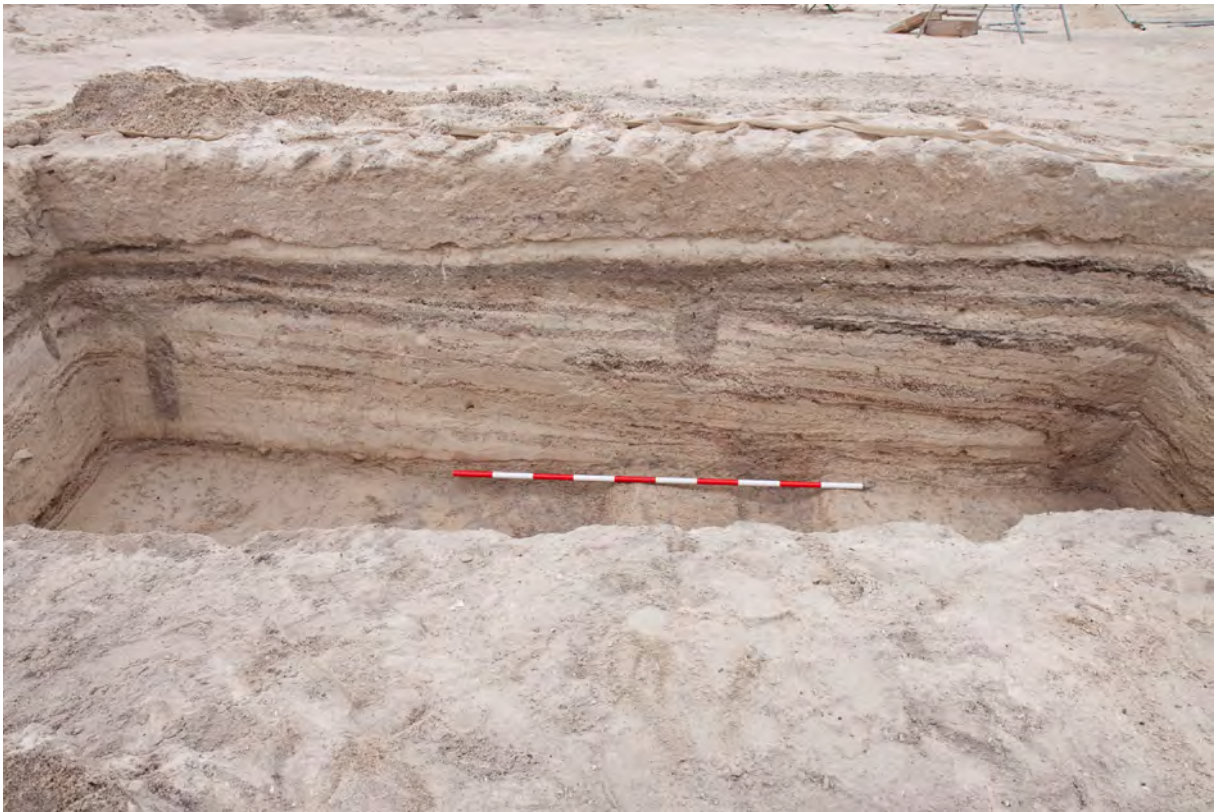




**Figure 6.3.4:** Gully (3230) (top) and gully (3240) in Trench 2



**Figure 6.3.5:** Stratigraphy revealed in the profile of Trench 1



**Figure 6.3.6:** Stratigraphy revealed in the profile of Trench 2

surface of beach shell and then sand (or in other cases, *vice versa*) was then placed on-top, only to be covered with a fresh layer of occupation debris. Occupation surfaces commonly appeared in the stratigraphy, which were then used, renewed and then reused. This is explicitly seen in this group by the presence of renewal deposits (3358-9) covering the phase below. In turn, this was truncated by a series of small stake-holes (loci, [3114, 3116, 3118, 3128]) roughly situated in a circle and then consequently covered with occupation deposits of sand, shell and charcoal (loci 3111 & 3362-8).

In Trench 2, the first group lay upon a thick renewal layer of sand (3224) covering the deposits of Phase 6. This was then overlain by another series of occupation deposits (loci 3319-22). Additionally cut into layer (3224) were a series of post-holes [loci 3215-22 & 3318] which were situated in similar positions to post holes [3196-3202] seen in Phase 4. It is possible that a structure was placed here and then removed. A series of deposits were then laid down and then the same structure was replaced in Phase 4, this time with a stronger structural support indicated by the large post hole [3197]. This is important since it shows that this area was used and reused for a similar purpose and not abandoned.

### **Group 2**

In Trench 1, an occupation-surface renewal-deposit (3108) consisted of fine yellow sand which acted as a base for a post hole [3107] and subsequent occupation deposits (loci 3105 & 3378). This post hole was related stratigraphically to post holes [3119-25] & [3129-30], one of which still contained remnants of wood (see 3123), indicating that these features held substantial wooden supports for tents or other temporary domestic structures.

In Trench 2, similar deposits were seen since a series of grey sandy shelly occupation deposits (loci 3205-7, 3325, 3323-4 and 3212) were revealed. This group also contained an intriguing gully [3230] to the far end of Trench 2 (Figure 6.2.6). The base of this gully was clearly below the water table and excavation was made difficult by the incoming tide. The purpose of the gully seemed inexplicable since only 2m of it was revealed. It was believed that it was cut purely for drainage purposes but as previously mentioned it may have been cut to replace gully [3240]. Due to the amount of water at this level, it is likely that this feature was cut for drainage.

#### **6.3.4 Phase 4**

Phase 4 represented a departure from the lighter coloured and irregular layers deposited in Phase 5. It contained deposits and archaeological features that indicated serious and concentrated occupation activity. This can be seen over the total site and also down through the stratigraphy revealed in Trenches 1 and 2 (Figure 6.2.4 and 6.2.5). Even though ZUEP03 was not excavated down to natural in its entirety, the deep soundings illuminated the type of activity that occurred here and provided a very detailed picture of a small area of site.

The archaeology underlying this deposit was divided into 5 groups, each group representing a period of occupation. These groups were established from the stratigraphic relationships seen in the deposits in both Trenches 1 and 2. In general, the majority of this phase was confined to Trench 2. Physically, this phase was not extensive, reaching only 0.6 m in depth. However, investigations within proved that there was a serious and intensive amount of activity here, marked in the archaeology by thin lenses of deposits demonstrating continual use and re-use of a small area.

##### ***Group 1***

This group marked the beginning of the third phase in ZUEP03. It indicated an intense period of activity and was seen stretching across both Trenches 1 and 2. In Trench 1, a fine white sand deposit (3077 – equal to deposit (3204) in Trench 2) was truncated by a small group of related post holes (loci 3081, 3093, 3095). These were then overlain by lenses of grey sand and ashy charcoal deposits (3380-3384, 3389-90, 3086, 3379, 3386) which were then cut by a series of post holes [3388, 3045, 3066, 3067, 3039] and a pit [3071].

In Trench 2, the deposits in this group were far more numerous since there were fewer truncations to destroy and therefore obscure the stratigraphy. Within group 1 of Trench 2, there were two sets of occupation sequences. On top of the earliest occupation surface (3204) lay varying occupation deposits of different colours and consistencies, all containing amounts of shell, bone, and pot (see loci 3290-3, 3188-95). Deposit (3195) was particularly indicative of this and contained large quantities of material finds to indicate a substantial phase of occupation. Additionally, there were a series of four post holes [3196-3203] which formed a circle with one massive post hole [3196] centred in the middle. This measured 0.50m x 0.25m and was 0.32m deep and contained a limestone block of the same dimensions. This likely was post packing for a large support post, possibly for a large temporary structure with the satellite post holes surrounding it. Whatever its purpose, these post holes were situated in almost exactly the same positions as post holes [3215-22 & 3318] seen in Phase 2, Group 1. It



shows that this area was being continually utilised again and again for a similar purpose, in this case possibly the erection of a tent.

The second set included thin yellow sand deposits (occupation surface renewal layers, loci 3186-7) lying beneath a series of grey sandy occupation lenses (loci 3294 – 99), a large post hole [3214] and a pit [3211] filled with charcoal. Overall, the two sets in this group from Trench 2 show a closely linked sequence of occupation, surface renewal and subsequent occupation coupled with the reuse of an area for structural supports for camping.

### ***Group 2***

The sequences of Group 2 were again a replication of the activity that had occurred previously. Once again, thin lenses of yellow grey sand and shell were interspersed with thin lenses of grey occupation deposits packed with pot, bone and charcoal (loci 3303, 3110, 3112, 3155, 3161, 3176, 3284, 3287, 3306-9,). One feature from this group was noteworthy – a small pit [3286] was seen in section in this trench, a precursor to pitting activities seen in group 3 and 4.

### ***Group 3***

This followed the same stratigraphic sequence as the previous two groups: an occupation surface was placed down to renew the surface below, after which varying degrees of occupational debris were deposited. First, coarse sandy shell layers were revealed (loci 3273-5) and placed upon a main pink yellow sandy shell layer (3153). In turn varying lenses of grey and yellow sand were deposited showing this surface had been used, renewed, and then used again (loci 3270-2, 3132-3, 3269, 3276 – 81). These lenses clearly indicated occupation as they contained shell, charcoal, pot and bone. The occupation surface was also truncated by varying sized archaeological features. Again evidence of postholes were present in this group [3100] & [3283], but without other related features it is impossible to state their purpose other than to say they are proof of yet more occupation.

### ***Group 4***

This demonstrated the same sequence of deposition seen in the previous groups where a sandy renewal layer (locus 3098) was placed down. Only a small deposit of dark grey hard sandy clay was present in section profile to suggest the possible presence of an established floor surface. On top of both of these were placed lenses of sand, shell and charcoal (see loci 3087, 3096-7, 3259, 3263, 3265, 3266). This small group of loci demonstrated another small period of occupational activity. It also included small pits [3261] and [3262], and a post hole [3328]. Both pits were fairly shallow suggesting that they were small rubbish pits.

### ***Group 5***

The first group of loci lying directly beneath burnt deposit (3028), indicated the presence of an occupation surface (3256, 3258 and 3260) on which lay occupation deposits (3062, 3063, 3257, 3063, 3255-7), postholes [3248-57], camp fire remnants (3088) and remnants of a small *tannūr* (loci 3058-





**Figure 6.3.7:** Burnt deposit (3028) underlying road and inner-city walls

61). The close vicinity of the postholes to the *tannūr* suggest a possible association with cooking activities – possibly remains of tri-pods/cooking pot supports over camp-fires. This of course is pure conjecture but the post-holes seem to surround the *tannūr*, lending weight to the idea that they were somehow related to it. The surface into which these loci were cut and deposited onto consisted of a compact grey clay sand, which was interpreted as a very definite occupation surface, despite its fragmented and damaged nature. Even though it was not solid enough for a floor in a building, this does reflect that there was some very concentrated occupation at this level.

The first group of loci also included many features from Trench 1. The first 0.4m below deposit (3028) was truncated heavily by post-holes [3041, 3043, 3047, 3065, 3068, 3070, 3074, 3076, 3083, 3401, 14] and pits [3091, 3375, 3398, 3403, 3405, 3410]. In plan, the post holes seem to represented a thick line across the trench, possibly indicating the presence of a barrier or indeed the possible likelihood of building support posts. It is interesting that these features are close to the inner-city wall. They could indicate the presence of a physical barrier, which may have been the precursor to the wall itself. Without excavating this entire area, however, this idea remains untested. The pits again signify intense activity. Only small thin deposits have remained demonstrating occupation (see 3404 & 3406-8) since the pits had truncated and thereby obscured stratigraphic relationships that previously existed here. The pits may have been dug for rubbish-dumping purposes, but this would make them very close to the occupation activity. They may have been dug as a means to gain fresh clean sand for renewing occupation surfaces. Another idea, particularly in reference to pit [3091], is that this slightly elongated pit, which is present both inside and outside the excavation area, is a robber trench, where a small wall had been demolished and the material had been taken and reused elsewhere.

### *Destruction Horizon (3028)*

The last locus of Phase 4 to be considered was a dark grey charcoal-rich silty sand (3028) (Figure 6.36). It has been suggested that this was indicative of the later destructive period that faced Al Zubārah in the late eighteenth/early nineteenth century. Alternatively, it could represent a period of intense occupation activity where charcoal deposits and other similar layers were trampled indiscriminately across site. The evidence of the small tannūr bases (loci 3423-7) lying on the surface are evidence of this. However, there are two points that strengthen the former argument. The first is that the extent of this layer is not clearly defined. The north-western extent of this deposit does not indicate that it was contained within an area or camp, rather, it appears as a homogenous spread, uniform in consistency and colour. Secondly, the deposit lies directly and stratigraphically beneath a period of possible abandonment, and as such, would represent evidence of the events that caused this subsequent abandonment. Deposit (3028) was therefore considered to correspond to a short sharp period of burning or serious destruction and marked the end of the intense occupation activity that was revealed in the stratigraphy of the trenches.

### **6.3.5 Phase 3: Abandonment**

Phase 3 included only one deposit (3017). This phase represented a break from any form of archaeological feature or occupation activity or deposit. It contained merely a large deposit of fairly sterile aeolian sand. It was very fine in texture and contained few finds or indeed traces of occupation. It was interpreted as a build up of natural wind blown sand from the beach due to its sterile nature, and fine consistency and colour. It is significant since it underlies all the walls and the road and signifies a period of abandonment. It seems that this deposit marked a lack of activity and contrasted deeply with the previous phase of intense occupation.

### **6.3.6 Phase 2: Construction and Ruin**

Phase 2 contained the extant remains of the tower, a wall running perpendicular to the inner city wall heading north-west, and the inner city wall <3010>. Phase 2 was split into three definable sets of activities. The first set incorporated the construction of the inner city wall and Tower 11. The second included loci relating to the dilapidation of these structures and the third related to subsequent temporary structures that were erected there.

#### *First Set—Architectural Construction*

Tower 11 on the inner-city wall was the key feature within ZUEP03 and investigations were undertaken to determine the extent of its remains, but moreover its general purpose in relation to Al Zubārah. The initial idea that it was a gatehouse guarding the road was dismissed once the road was proven to be of modern construction (see below). The tower was revealed to have been constructed on natural beach sand, without the need of any foundation or indeed construction cuts. Excavation

within the tower walls revealed it was constructed upon a coarse mid brown grey sandy lime mortar (3031). Since this deposit was patchy and fairly thin, it was interpreted as construction debris and not a construction pad on which the structure was deliberately built.

The tower wall <3027> was built directly upon this deposit and surviving remains measured 0.53m high from ground surface. This wall was built in a “D” shape and was contemporary with the inner-city wall remnants <3010>, <3024> and <3030> (Figure 6.3.8-6.3.11) It was constructed from un-worked and roughly hewn beach stone blocks bound with a light brown grey sandy mortar. There were no signs that tower-wall <3027> abutted wall <3024> or vice versa. Rather, the two architectural features appeared to have been built at the same time in one construction event. Although mostly collapsed, in some places it survived to 5 courses high – this was especially evident from inside the tower itself (Figure 6.3.9). The wall courses were damaged slightly in the north-east by truncation (3023). The tower-stone was similar to that used to build the inner-city wall, again supporting the idea that the two were contemporary.

The interior space of the tower was filled with rubble. Half of this was excavated leaving a clean section to display the relationship it had with both the D-shaped tower wall <3027> and inner-city wall <3024> (Figure 6.3.9 & 6.3.10). The rubble fill (3026) was entirely homogeneous consisting of coarse sand binding large roughly hewn limestone rocks. Few archaeological finds were retrieved from the fill. The rubble was too sterile and too full of stone blocks to be just demolition, rather, it seems this was deliberately placed inside and did not indicate a phase of dilapidation and collapse. This locus is important since it helps indicate the possible nature of the tower. Since the tower had no internal space, was not placed within a structure such as a garrison or fort, and could easily be accessed to from all sides, it can be stated that the structure may have been more of a look-out position. Certainly, rifles and weapons could be used from the top, but it seems that the tower’s vicinity to the beach overlooking the bay would confirm that the tower may have been used as a viewing platform. Such a building characteristic can be demonstrated in the tower found on EP01 which also had no internal spaces and was also filled with rubble.

Like Tower 5 from EP01, Tower 11 had a ramp like structure attached to its south-eastern wall (Figure 6.3.10). This was represented by deposit (3029) and was seen to gently rise and follow the shape of the semi-circular wall <3027> round to the east. Comparisons were consequently made to Tower 5 in ZUEP01 since a similar ramp was seen to spiral round the turret to provide access to the very top. Tower 11’s ramp was heavily damaged and much of it had collapsed – only 0.12m survived above ground level. Even though there was a small amount remaining, it was definitely clear that a coarse lime mortar sloped gently around the south of the tower. Both the ramp and the rubble infill, together with the absence of any entranceway to the inside, lend more weight to the argument that Tower 11, like Tower 5, was a watch-tower rather than a stronghold. It indicates that it was merely a fortified platform, accessible through the means of a spiral ramp, which had enough room on top for defensive elements if necessary.

## ***Walls***

As previously mentioned, Tower 11 was contemporary with the inner-city wall <3010>. This wall ran northwest/southeast across site and joined the tower. The wall had been damaged over time and





**Figure 6.3.8:** The remains of Tower 11 together with semi-excavated interior displaying interior rubble core



**Figure 6.3.9:** Wall structure of Tower 11





**Figure 6.3.10:** Rubble core of tower 11 displaying ramp remnants close to the 2m scale



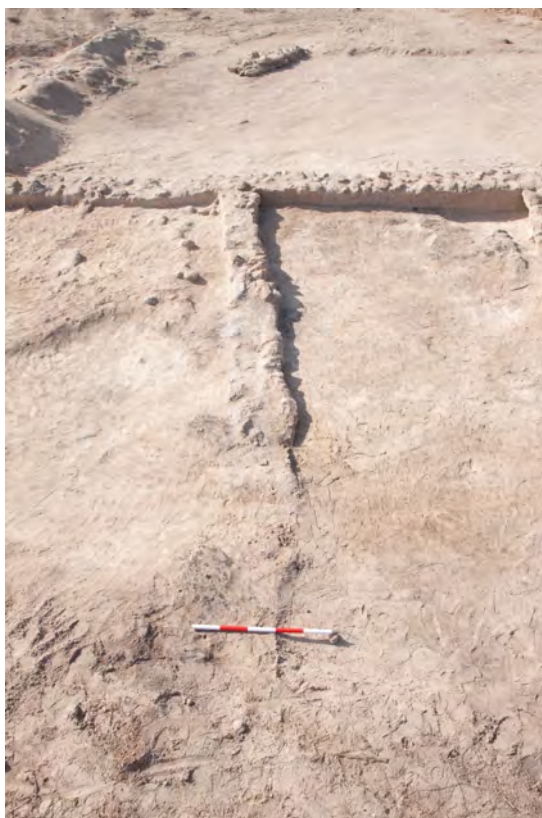
**Figure 6.3.11:** Inner city wall joining Tower 11 – damaged and fragmented due to subsequent road construction

remained in four separate segments. The first main segment of the was wall <3010> which survived to 15m in length and to a height of 0.45m. It was comprised of limestone foundations and then courses of coarse beach-stone. The un-worked and roughly hewn beachstone was randomly coursed and rendered with a mid grey sandy lime mortar, which can also be seen coating the north and south faces. It was badly damaged by the road surface <3007> and <3004> to the extent that a small 4.8m piece had become totally separated from both it and the tower complex in the northwest. This piece of architecture <3030> survived to one course high (0.3m) and although it was severely fragmented, could still be identified as the missing link that tied both wall <3010> and tower-wall <3024> together. The inner-city wall was represented in the northwest by wall <3024>, which was 0.65m high and by far the best surviving example of the height of the wall. As previously mentioned, it was this segment that was physically built into the D-shaped tower wall <3027>. What is interesting about this main site feature is that neither the width nor height of the wall is substantial. The matrix of the wall, while solid, is neither impressive nor well-finished. The height of the wall, while providing a healthy obstacle, is neither tall nor impressive. The width of the wall, while providing a surface on which a grown man could walk, would by no means withstand artillery fire or a determined enemy. The watchtower would add little more to the wall's purposes if it was indeed intended as a defensive measure. The wall rather appears to represent more a boundary that delineated town boundaries and possibly separate the new town from the old town. After excavation of the modern sand layer (3016) (see Phase 1), it was clearly seen that the inner city wall was linked to the tower. The remains of the inner city wall <3010> were badly damaged after the construction of the road but some of the foundations still remained. This is good evidence to state that any former routes along the coast did not pass through here – it would seem sensible that the beach was used as a route as opposed to wasting valuable time, energy and resources on road construction. This is also good evidence to dismiss the former idea that the tower was used as a gatehouse.

### *Perpendicular Wall (3011)*

Wall <3011> ran perpendicular to wall <3010> and although badly damaged was comprised of beach-stone that reached 2 courses high to a maximum height of 0.25m (Figure 6.3.12). It seemed contemporary to the inner city wall due to a similarity in height (the tops of both walls were level), similar construction materials and also because it was constructed upon the same deposit (3017) as the city wall itself. Wall <3011> was associated with two floor surfaces (3018) and (3021), showing signs of occupation in the form of dark charcoal stains synonymous with camp fires and other material evidence (bone, pot). It seems likely that both this wall and these surfaces indicated some form of occupation, although the wall is unusual since does not form a room or indeed contribute to any form of enclosed space. No other architectural features corresponded to this wall. The only possible scenario, if <3011> belonged to a larger structure, is that the building material from the remaining structure was robbed to such an extent to make it disappear completely. This, however, seems unlikely since at least traces of such other walls (e.g. robber trenches) should remain.



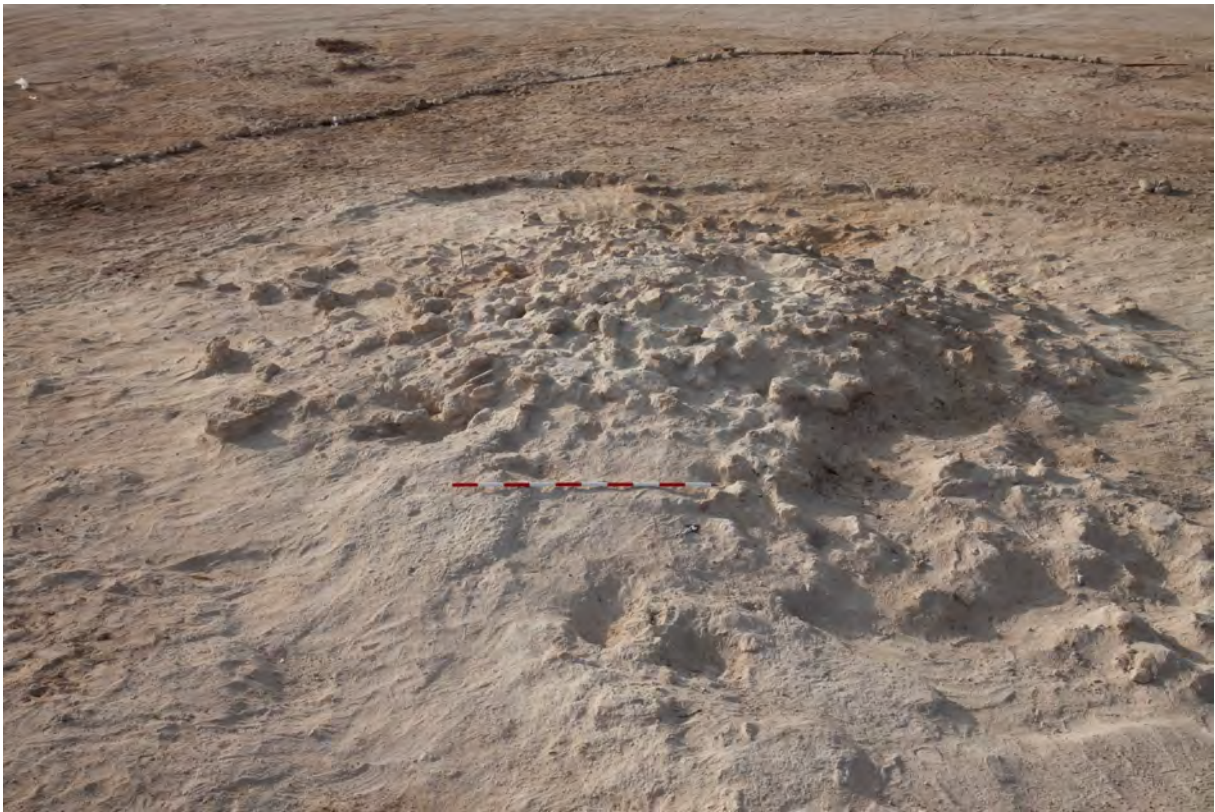


**Figure 6.3.12:** Wall (3011) constructed perpendicular to inner city wall (3010)



**Figure 6.3.13:** Tower wall dilapidation





**Figure 6.3.14:** General demolition rubble over Tower 11



**Figure 6.3.15:** Temporary shelter built of loose rocks (3008)



### *Second Set—Dilapidation*

The second set of loci is related to the dilapidation and collapse of the architectural features. A large deposit of tumbled beach stone and mortar (deposit 3020) signified the collapse of the north-western end of the inner city wall (wall segment 3024). This wall was revealed to be tilting towards the north but propped up from total collapse by the dilapidation deposit (3020). Beneath this deposit lay a thin layer of windblown sand (3032) which had built up against the wall showing the tower had remained in tact for a period of time before collapsing. It was left unexcavated to preserve the structural integrity of the leaning wall (3024).

Other dilapidation and collapse deposits in the direct vicinity of Tower 5 included (3025) and (3013). Deposit (3025) included smashed and demolished remains of the north-western end of inner-city wall segment <3030> due to the construction of the road. Deposit (3013) again represented demolition material, but this time was highly compact. It was believed that this deposit was the ramp mentioned in the first set which had collapsed and slumped together with other demolition materials from the tower wall. On top of all these deposits and over the entire tower structure itself lay loose demolition deposit (3002) comprised of sand and rubble from both the tower and inner city wall (Figure 6.3.14). It represented the culmination of windblown deposits over a period of time and the general structural collapse of the tower and wall architecture.

Dilapidation deposits were also revealed pertaining to the largest inner-city wall segment <3010>. Deposit (3006) represented rubble lying against its southern face. On the northern side, the perpendicular wall (3011) and its associated occupation deposits (3018) and (3021) were covered by tumble deposits (3012) and (3014) respectively. It is interesting that between occupation surface (3021) seen in the first set and the subsequent tumble (3014), there is a layer of windblown sand (3019). This is true in the south-eastern area of site where windblown sand deposits (3416) and (3417) lie below a collapse-deposit of sand (3418), clearly indicating a period of abandonment/inactivity before the wall had collapsed.

### *Third Set—Temporary Shelters*

The temporary rock shelters found within this set were revealed both in the south-east and north ends of site. In the southeast, removal of overburden deposit (3001) revealed a rock tumble (3003) which covered wall <3008>, constructed from randomly coursed large flat beach-stone blocks (Figure 6.3.15). This feature was unusual that it was fairly small (only 3.10m x 0.80m) and was physically unconnected to any other surrounding architectural features. Interestingly, wall <3008> provided shelter against the oncoming wind from the beach and was interpreted as remnants of a beach/Bedouin shelter, much like feature <3015>.

Initially, the beach-stone rock feature <3015> was believed to be a wall since it appeared to be built perpendicular to <3010>. However, investigation revealed it was merely the possible basis for a rock shelter, with no mortar or coursing, positioned directly against the incoming sea breeze, similar to wall <3008>. It was related to (3012), a deposit containing other tumbled stone, and remains of small patches of charcoal, indicating the previous presence of camp fires. It was believed that these deposits and features were relatively recent since they were physically highest in the stratigraphic record,

perhaps indicating a very temporary camp which utilised the extant remains of (3010) and wall <3011> to create a shelter.

### **6.3.7 Phase 1: Modern**

The last phase contained all loci pertaining to recent events. Initial overburden deposits (including (3000), (3001) and (3005)) consisted of simple windblown layers containing modern rubbish and general beach detritus of no archaeological interest. The removal of the overburden that covered the site presented two definable groups of modern features. These included a road and a truncation intruding into the extant tower remains.

#### ***Modern Truncation***

This feature clearly truncated the remains of Tower 11 and was filled by a mid yellow brown silty sand (3009) which contained glass, plastic bottles, rope, wood and other modern day rubbish. The truncation was interesting since it extended into the material remains of the tower and it was suggested it may have been a machine-cut made from beach clearance activities after the 1990's Gulf War. Indeed, there is evidence of beach clearance in the form of large piles of tar and rubbish (approximately 5m x 5m x 1.5m) seen roughly 100-200m from the site. In any case, material from this feature confirmed it was a very modern intervention.

#### ***Road***

The modern road surface consisted of deposits <3004> and <3007>. The former was extremely hard, having been compacted by vehicles frequenting the beach front, and formed the top surface of the road. Once excavated, another surface of road metting <3007> was revealed consisting of small stone compacted amidst a mix of light red sand (Figure 6.3.16). The metting for the road was sieved and both modern ceramic and small traces of animal bone were salvaged. Interestingly, stone found in the red-sandy deposit seemed similar to stone found at the Qal'at Murayr survey site close to the present-day Al Zubārah fort. It seems that it may have been deliberately taken from this area (or indeed an area like it) and deposited here. It was hoped that the road was contemporary with the tower since it would mean that the pier, located 400m south of site and also connected to the road, would also be contemporaneous. However, it was seen in places that the metted surface lay directly on top of the demolition material of the tower <3002>, indicating that the road had been built after the tower's dilapidation. Furthermore, glass and modern plastic were discovered in the metted deposit highlighting that the road was constructed recently, possibly as a means of securing an established highway for modern vehicles that served the campsites here in the cooler months. Additionally, directly under the road surface lay a deposit containing modern rubbish. Light brown yellow sand (3016) which was almost sterile in terms of finds except for small pot fragments and the broken remains of a small light bulb lay directly beneath the road. The lack of finds and soil consistency suggests that the deposit was formed from wind blown sand which had covered the broken extant remains of the inner city wall (3010) linked to the tower. It is significant since it displays a period of inactivity where windblown deposits (containing modern electrical rubbish) had covered the ruins associated with Al Zubārah and then a modern road had been laid down over the top.



**Figure 6.3.16:** Road metting clearly overlaying the inner-city wall and tower demolition deposits

The road abruptly stopped approximately 2-3m northeast of the tower. It was suggested that it may have been removed by bulldozers in beach clearance activities after the oil spillage of the 1990's Gulf War. However, there was no evidence of a destroyed road piled up with the spillage detritus. It is possible therefore that the highly robust stone was placed as a road for modern vehicles in an area where the ground was too soft or in a bid to preserve and bridge the extant archaeological remains below. The inner city wall stretched right up to the tower, therefore providing an obstacle for drivers wishing to find a direct route along the beach. Whatever the case, this feature was deemed modern and since there was no real need to destroy and excavate the whole surface within the limits of the site, only the road that covered the extant remains of the tower and the inner city wall was removed.

### **6.3.8 Conclusion and Recommendations**

The excavation of this site effectively addressed the three main research objectives mentioned in the introduction. The road was confirmed as a modern construction and as such, did not prove that the pier further south was part of the Al Zubārah settlement. Excavations characterised Tower 11 as a watch tower, which overlooked the bay either for commercial shipping or for oncoming enemies. The idea that it was a gate-house made for the road that ran from the pier was dismissed. Additionally, work here effectively characterised the inner-city wall as well, and confirmed that the tower was

included as part of its construction. The wall appears to have been merely a boundary wall and not a defensive structure. The two evaluation trenches cut next to the wall effectively aided a small and very detailed insight into the stratigraphy of this area. The three phases of archaeology seen therein displayed an area that had been used temporarily and intermittently as a zone of more ephemeral settlement consisting of tents and/ or huts, which had then grown in popularity to the extent that by the time the ZUEP03 area was abandoned, permanent or semi-permanent occupation had been occurring here.

The evaluation trenches have both their positive and negative aspects. Interestingly, it is the large deposit (3028) and the subsequent trench deposits that link this area to those of ZUEP01 and ZUEP02. On these sites, layers of blackened charcoal-rich deposits were found overlying complex archaeology that indicated intense occupation activity had been brought to a swift halt by a period of destruction/demolition (see Sections 6.1 and 6.2). This sequence is also clearly demonstrated at ZUEP03. However, the disadvantages of cutting these trenches lies in what they did not reveal. Most layers near the very top of Trench 1 and 2 seem to be well established, almost like proper floor surfaces found within buildings. The question that arises here is whether the location of the trenches had just missed masonry structures that point towards early buildings built before the construction of the inner city wall. It seems unlikely that these trenches were placed in a courtyard or open-area within a constructed precinct – these features should have been evident from the ground surface. The evidence of post holes and other pitting activities strengthens the argument that, along with the absence of masonry structures, this area was used for temporary structures, such as tents or huts.

Despite their shortcomings, the trenches have highlighted the type of activity that was occurring. Excavations at ZUEP03 have also revealed, and adequately recorded, the only remaining architectural features in this area, as well as dismissing the idea that somehow the pier was part of the original settlement.



## 6.4 Zubārah Excavation Point 04

*Tom Collie*

### 6.4.1 Introduction

The site at Excavation Point Four (hereafter ZUEP04) was located in the southeastern part of Al Zubārah and focused on an area containing a number of large rooms and courtyards enclosed by a massive perimeter wall with associated corner towers (Figure 6.4.1). It spanned an area of 35m x 35m with the south-western corner of the grid located at 180940E/468670N. The excavation area centred on the south-western corner of the precinct area, incorporating the corner-tower remnants, part of the outer wall, the precinct wall and also five rooms within the precinct itself. ZUEP04 was opened for three main reasons. The first was to gain a fresh view of Al Zubārah in its earliest stages of development since previous excavation points had centred on later archaeological targets situated within the inner-city wall. The second was to gain insight into the lives of what can be assumed to have been an important family or group in Al Zubārah's society. The third reason was to extend the characterisation of Al Zubārah as a whole archaeological entity. By placing ZUEP04 far away from the other two excavation areas, a wider understanding of the development of Al Zubārah was gained.

Investigations in this area were centred on three main objectives. The first was to fully characterise and record the architecture of the south-western precinct tower. The second was to cut a small trench between the outer precinct wall and outer town wall to gain information, dating evidence and relational stratigraphic evidence between the two features and thereby relate the construction of the palatial compound with the outer town wall. The third and final objective was to excavate and thereby characterise a number of rooms to the east of the tower housed inside the compound.

These objectives were clear and concise, proposed minimum intrusion to surviving archaeology while simultaneously detailing areas the development and chronology. The archaeology revealed was organised into four phases, the fourth representing the earliest activity through to the first, relating to the latest. The fourth phase corresponds pre-construction activity. Phase 3 represents the construction of the building revealing, where displayed, the processes and materials used. Phase 2 relates to the occupation of the building including architectural renovations, dumped midden deposits discovered outside the precinct wall and the occupation deposits and features found within the precinct rooms. Phase 1 - the youngest - included the most modern remains and incorporated the modern road surfaces, overburden deposits as well as the dilapidation and demolition deposits pertaining to the gradual degradation of the precinct architecture.

Prior to any archaeological investigation, the whole precinct area was digitally surveyed and a detailed plan of the internal structures of the precinct was completed (Figure 6.4.1). Digital surveying of the EP04 excavation area was also used to successfully record the present height of existing ground levels prior to excavation. This information is easily combined to give a full and comprehensive picture of this area of Al Zubārah prior to any intrusive archaeological investigation.

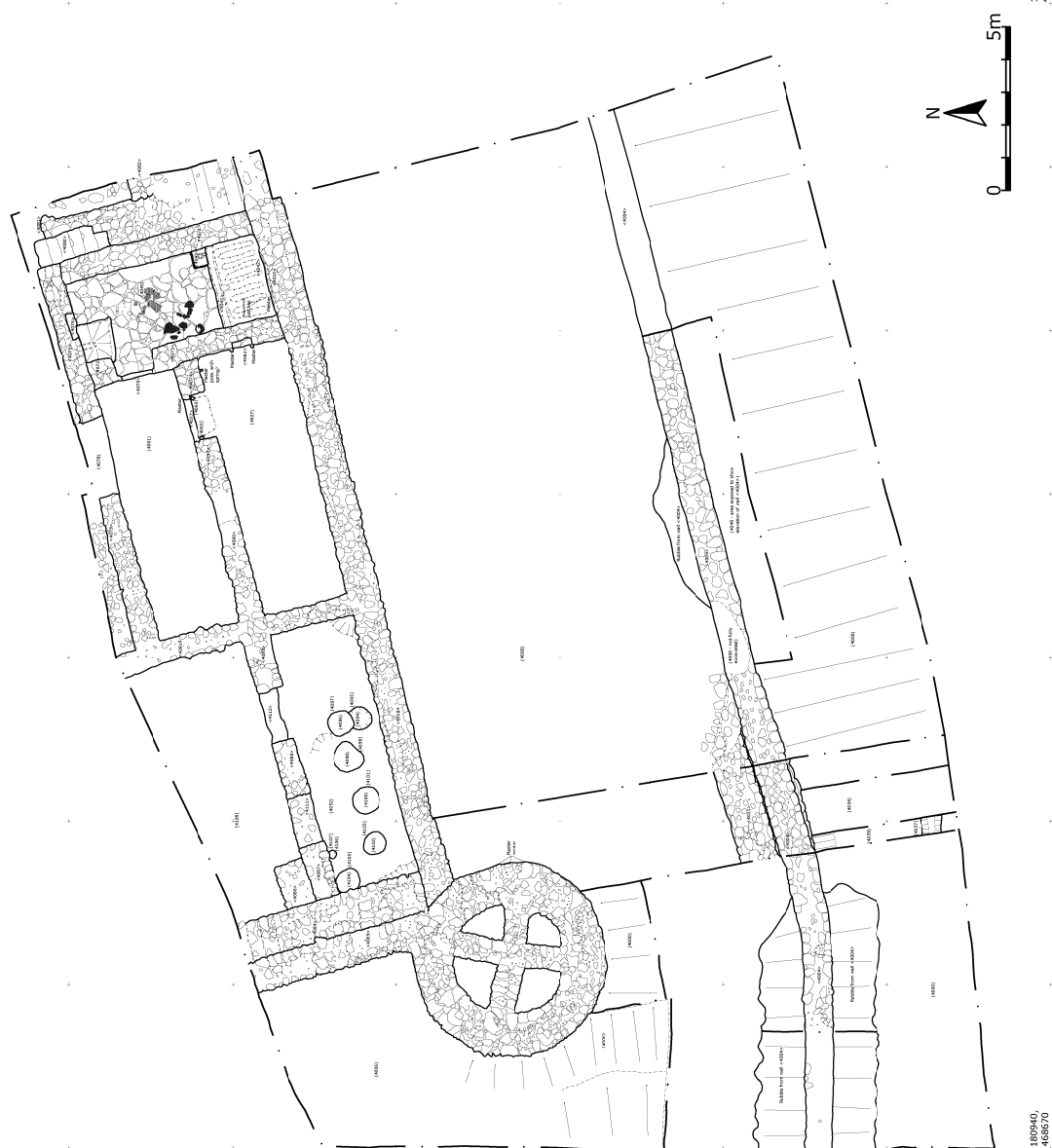
The archaeology revealed was discovered in six main spaces (Figure 6.4.2). Spaces 3000 and 3006 were located in an investigative evaluation trench located north and south of the outer city wall respectively. Spaces 3001 through to 3005 included the rooms within the precinct walls and represent



**Figure 6.4.1:** Plan of the 'palatial compound' and location of ZUEP04.

180940,  
468705

180940,  
468705



**Figure 6.4.2:** Post-excavation plan of Excavation Point 4 (EP04)

180940,  
468705

180940,  
468705

domestic spaces. Where the midden south of the tower was concerned, deposits had to be excavated in sequential spits, deviating somewhat from the standard excavation methodology of single-context recording (see Section 4). These spits contained highly mixed deposits of varying coloured sands, silts, ash and shell and so were excavated together in small groups. Where excavation was considered unnecessary or needlessly damaging to the archaeological remains, some features and contexts, particularly plastered walls and floors, were merely recorded and preserved *in situ*.

#### **6.4.2 Phase 4: Pre-Compound Construction**

Phase 4 related to archaeology revealed purely in Space 3000 and 3006 that pre-dates the compound and outer city wall. This phase includes the natural deposits of light yellow grey bands of sand and marine shell which constitute the *sabkha*. Evidence of cuttle-fish bone was discovered at this level along with marine shells. The natural geology appears to slightly rise from the south to the north towards where the precinct and outer city wall were built. Natural geology was only revealed in spaces 3000 and 3006 since intrusive excavations in spaces 3003-5 only extended to the plaster floors,.

Only one archaeological feature was revealed truncating the *sabkha* in Space 3006. This consisted of a 0.18m deep gully [4057] that appeared to run parallel to the outer city wall. This gully may represent a drainage feature, to prevent rising water from the *sabkha* reaching the wall and thereby compromising its structural integrity.

#### **6.4.3 Phase 3: Compound Construction**

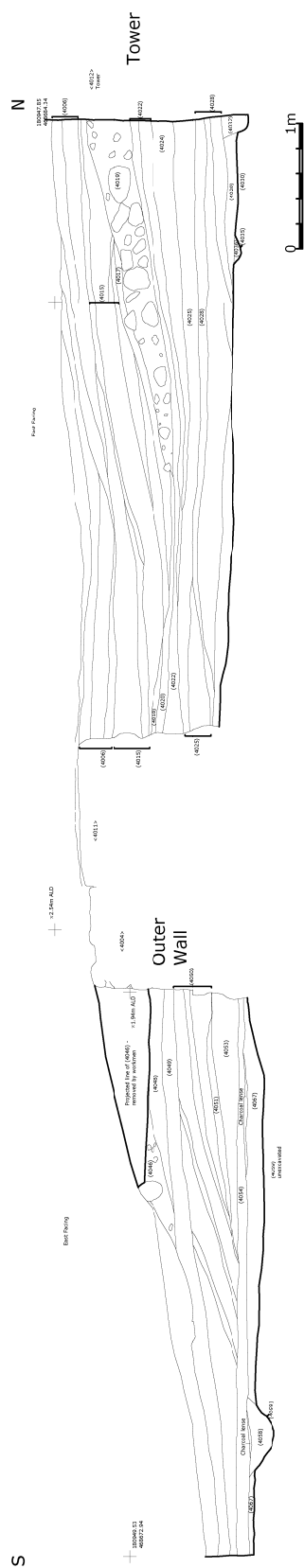
Phase 3 details archaeology relating to the outer city wall, the construction of the precinct walls and the rooms within. A discussion on the purpose of these rooms and their contents is dealt with in the subsequent Phase 3, which deals with the occupation of the precinct in general.

#### ***Wall/Tower Construction Sequence***

The tower <4012> and adjoining north/south wall <4069> were built directly onto natural sands. Precinct wall <4010> was then built into this structure. Physically surrounding the tower lay deposit (4030), a layer of thin gritty sand packed with mortar fragments. The outer wall <4004> was revealed to have been constructed on a similar horizon of trampled mortar. This compact grey brown gritty sandy silt deposit (3054) was very similar in consistency to deposit (4030) and was found at the same level but on the southern side of the outer city wall. Both deposits seemed to be trample layers and from this evidence it seems that the tower and precinct architecture was built prior to the outer wall.

Even though the deposit stratigraphically proves that the tower was built first, it is possible that both may have been built at the same time. Even though deposit (4030) overlaid the precinct tower, it was so thin as to suggest that this was merely construction material that had fallen to the ground during the building process. Since deposit (4030) was equal to deposit (4054), it seems that even if the wall and the tower were built one after another, there was little time taken between the two construction episodes. These deposits were mere interfaces between the construction processes and the natural





**Figure 6.4.3:** Section drawing of deposits in spaces 3000 and 3006



**Figure 6.4.4:** Western side of tower (4012) displaying internal masonry support



**Figure 6.4.5:** Eastern side of tower (4012) displaying external plaster

sediment below. In this case, the wall and the tower construction should therefore be seen as complimentary events, the wall being laid down very shortly after the tower, or indeed, maybe even constructed at the same time. This would indicate that the precinct building belonged to one of the earliest phases of Al Zubārah town construction, making it practically contemporary with the outer city wall.

### ***Tower***

The precinct's south-west tower marks a distinct difference to the towers discovered in areas ZUEP01 and ZUEP03. The tower was substantial, with a diameter of almost 6m. Its interior was not filled purely with rubble, like the one seen at ZUEP03. Instead, a substantial masonry cross-like structure had been constructed indicating substantial support for the tower's external walls (Figure 6.4.4). Three reasons have been put forward for its presence. The first most likely explanation may have been due to the original towers height, which required an internal support to prevent collapse. A calculation based on the length of the staircase feature <4084> together with an average height of one single step-riser suggested that the original height of the tower measured approximately 4m. Hardly monumental in modern terms but large enough to necessitate some form of architectural support mechanism. Secondly, it may have provided defensive support to withstand substantial impact from oncoming enemy assault or artillery fire. The towers height and subsequent strength would allow a substantial defensive position and viewpoint if needed. It has also been suggested that the masonry cross would act as a shock-dissipater for artillery that could be mounted on top. Finally, the cross could have fulfilled all three or any combination of these functions.

Both the masonry cross and the tower walls were constructed from roughly hewn beach stone blocks and tabular limestone slabs, the largest measuring 0.4m in both length and width and 0.15m in depth. The cross was built into the exterior walls and all masonry stone was bonded together with a light brown coarse gritty mortar. The eastern side of the tower survived to a far better condition compared to the west, where a substantial amount of the exterior wall had collapsed. The eastern and south eastern sides of the tower however had not collapsed and were rendered with a grey brown coarse plaster (Figure 6.4.5). This plaster was revealed to continue round the tower to the west and had obviously collapsed along with the rest of the western wall. It is clear that this plaster once covered the entire structure.

The materials used to construct this building appear to signify substantial financial expense. The tower represents a construction by, and maybe for, the wealthier occupants of Al Zubārah. This could indicate activities of a ruling family who were important enough to oversee part of a large towns defence system. It is true that this tower is situated in a position whereby it could provide defensive support to tower 19 on the outer city wall. In many ways, this massive tower construction is the first sign of many to indicate that the excavations at ZUEP04 were situated in an area of wealth and high-status.

### ***Walls***

As previously mentioned, the tower was constructed and built into the north/south running precinct wall <4069>. Both these structures were contemporary. The east/west precinct perimeter wall

<4010> was revealed to adjoin tower <4012> at foundation level suggesting that the north/south leg of the precinct wall and the tower were completed prior to the construction of wall <4010>. Both walls <4010> and <4069> were comprised of the same material: roughly hewn large limestone and beach stone blocks. They were both bonded by a light yellow brown coarse sandy mortar, similar to the other interior precinct walls. The north/south running wall <4069> survived up to 8 courses high, but looked substantially more weathered than the east/west running wall <4010>, presumably because it faced the oncoming winds from the sea and because wall <4010> was protected by both the tower and the outer city wall. Despite their weathered and dilapidated states, both walls were highly substantial, both in height, width and length. Indeed, wall (4010) seemed to equal the height of the tower. Both walls were almost a metre thick and stretched far beyond the L.O.E. They represent large expenditure in terms of materials imported into the area and support the case that once again this structure is indicative of an important family who commanded significant resources to erect a large structure that incorporated defensive features into its design.

The interior area of the precinct was divided by wall (4091) which effectively separated it into two areas (Figure 6.4.6). East of this wall were Spaces 3003, 3004 and 3005. West of the wall were 3001 and 3002. Since this wall abutted exterior precinct wall <4010> and also formed a main dividing line within the interior, it is believed to have been built right after the construction of the exterior perimeter walls. The wall was formed from roughly hewn limestone blocks and bound together with a grey yellow sandy mortar. The eastern side of this wall had remnants of a coarse pink grey plaster at its base. By contrast, the western side of the wall and the areas located to the west are rougher – the walls have no or little plaster. The floors, although hard, do not have the same smooth, level, plaster-floor surfaces. It was thought that the western Spaces 3001 and 3002 formed part of a kitchen and courtyard area. Another idea was that Space 3002 was just another room, bounded to the north by a east/west running wall that was again beyond the L.O.E.. Since these areas were not fully excavated in 2010, this needs further investigation in the future. Whatever the case, these western spaces contrasted to those to the east of wall <4091>. It is clear from this evidence and the plaster floors in spaces 3003-5 that the eastern area of this wall represents a more lavish domestic space.

### ***Architectural Features in Spaces West of Wall <4091>***

Spaces 3001 and 3002 both contained the staircase that provided an access to the top of the tower (Figure 6.4.7). The staircase was badly damaged but still displayed evidence of badly worn steps towards the base. The three remaining identifiable steps had an average height of 0.28m. The staircase abutted and ran parallel to north/south wall <4069> and was constructed from the same material as all the architectural features on this site. The staircase was built after the construction of the tower and outer perimeter wall but prior to the east/west wall features that divided Spaces 3001 and 3002.

These features comprised wall numbers <4087>, <4088> and <4093> and also wall numbers <4111> and <4112> (Figure 6.4.9). It was originally thought that the first three wall segments were all separate features, collectively forming a wall and two door ways allowing access between spaces 3001 and 3002. However, further excavation revealed that the three segments were joined together by underlying wall foundations spanning the width of spaces 3001 and 3002. To determine the actual depth of this wall further excavations in this area will be necessary. No thresholds were put in place or markers for doorways. Instead an east/west wall was constructed and where necessary doorways





**Figure 6.4.6:** Excavation Point 04 looking west, with north/south running wall (4091) separating spaces 3001-2 (furthest from camera) and spaces 3003-5.



**Figure 6.4.7:** Staircase <4084> leading up to tower <4012>





**Figure 6.4.8:** Wall segments <4093>, <4088>, <4087> separating Spaces 3001 and 3002 (left to right) together with stone plinth <4086>



**Figure 6.4.9:** Wall segment <4088>

were formed by the mere absence of stone. Indeed, examination of wall segment <4088> displayed possible indications of an arch spring, indicating that these entranceways were left permanently open (Figure 6.4.8). All this evidence points to the idea that these spaces were purely functional, a direct contrast to those well-decorated rooms to the east.

The last architectural feature evident in Space 3002 was stone plinth feature <4086>. This small 1.4m x 1m stone platform was revealed to abut both the staircase <4084> and the east/west diving wall segment (4087). It was constructed from the usual roughly hewn limestone blocks, randomly coursed and bound with a grey coarse mortar. The purpose of the structure was unclear, but it may have given support to both wall <4091> and the staircase. However, it was only 0.55m high above ground level and was dwarfed by both the features it was thought to uphold. It could have served as a work surface, sitting area or could have had an altogether different purpose.

#### ***Architectural Features in Spaces East of Wall <4091>***

The eastern area of north/south diving wall <4091> was divided into three spaces. Both Spaces 3003 and 3004 included wall <4091> as their western-most extent (Figure 6.4.10). Access to space 3005 was gained via space 3004. The construction sequence for the walls in this eastern area seemed fairly straightforward, with walls <4079> and <4070> forming a northernmost extent, running parallel to perimeter wall <4010>. After this, north/south running walls <4071> and <4073 + 4072> were constructed, effectively forming Space 3005. Lastly, east/west wall <4090 + 4074> was constructed, clearly butting north/south running walls <4091> and <4073>. This wall thereby defined Spaces 3003 and 3004.

These spaces contained features that clearly displayed high-status attributes, most of which are discussed in the occupation phase. All thresholds (Loci <4077> and <4075>), which marked the doorways between the spaces, were constructed prior to the construction of plaster floor surfaces. Both Spaces 3003 and 3004 contained very well preserved smooth, level plaster floors. Evidence of this can be seen too in Space 3005 although this seems badly damaged, revealing the presence of flagstones beneath. Similarly, damage in the east end floor of Space 3003 displayed similar stones, suggesting these were placed down initially to form a level surface, and were then plastered over.

The last architectural features of this phase were features lying at the very eastern end of the excavation area. This included a north/south running wall <4081>, obscured partially by demolition rubble, and a staircase <4080> (Figure 6.4.11). It is clear that the staircase was built between north/south walls <4071> and <4081> suggesting it was either built at the same time or indeed after Space 3005 had been formed. The stairs indicated the presence of another level which may have been built over the top of Space 3005 or indeed on a higher level next to it. These architectural features lay directly on the edge of the excavation area and will need to be examined in a future season of work.

#### **6.4.4 Phase 2: Occupation**

Phase 3 pertains to the actual activity associated with the precinct and its surroundings. It includes renovations made to the tower and outer city wall, large midden deposits indicating occupation that





**Figure 6.4.10:** Rooms 3003 and 3004 linked by threshold (4077) (right) with wall (4091) running north/south



**Figure 6.4.11:** Small staircase (4080)



accumulated between the outer town wall and the palatial compound in space 3000 and also features and deposits discovered in the five interior spaces.

### ***Renovations - Buttress***

The first aspect of renovation in this phase came in the form of a limestone buttress <4011> that ran parallel to, and abutted, the outer city wall (Figure 6.4.12). It measured the same height and added 1.2m more width to the outer wall's existing 0.92m. The feature seemed hastily built, using poor quality materials. Buttress (4011) was constructed from roughly hewn large limestone blocks with the occasional beach-stone. Some of this limestone was soft and degraded and contrasted greatly with the harder stones and mortar from the outer wall. The damaged limestone formed a structure of 6 stone courses which retained a rubble core and seemed hurriedly built in order to support the city wall.

The buttress appeared to have been added soon after the construction of the original outer wall. Beneath buttress (4011) lay a 0.11m thick dumped occupation deposit of fine ashy silt packed with charcoal, marine shell, pot and bone, possibly originating from the precinct interior. There was no sign of any windblown sand deposits beneath this to suggest that this area had been left open to the elements for very long. It seems that the deposit had been dumped against the outer wall soon after it was built and then the buttress had been hastily erected on top thereafter. The buttress may have been erected to strengthen the wall, possibly against artillery fire, or it may have been built to provide an artillery platform on top of the wall or provide space for a manned defensive position. It may have been built simply to repair part of the wall that was poorly built in the initial construction phase. Given the proximity of the *sabkha*, which is still occasionally flooded during high tides, it may have acted as a flood defense. It is difficult to form a fully suitable answer for this structure when only 2m of it was revealed in the evaluation trench and, as such, it cannot be definitively stated that it was present along the entire length of the city wall. It would be interesting to reveal the extent of this structure in order to explain its purpose in relation to the outer wall.

### ***Tower Wall Renovation Features***

The second aspect of architectural renovation in this phase relates to the plaster rendering episodes on tower <4012> and east/west wall <4010>. On the face of wall <4010> lay a light green grey plaster (4068) which clearly illustrated that the outer precinct wall had been repaired, or at least improved in appearance (Figure 6.4.13). The rendering episode was also clearly seen laying both stratigraphically and physically over deposit (4029). This deposit was interpreted as material that had fallen around the tower and the wall during basic construction. Since this was the case, it was clear that the rendering episode had occurred some time after the original construction phase. Moreover, a small trench [4033] running directly around the base of tower also truncated deposit (4029). This truncation was interpreted as a feature that would facilitate the plaster rendering of the tower itself right to its very base. Since the tower stands against oncoming coastal winds, the plaster render may have been a necessity and less of a status symbol – it would have actually aided the preservation of the towers structural integrity and minimise the damages caused by wind erosion. Both plaster renders on the wall and the tower are explained as improvements to structure as well as appearance, again confirm-



**Figure 6.4.12:** Buttress (4011) lying on top of deposit (4034)



**Figure 6.4.13:** Render (4068) on the outside face of wall (4010)

ing the idea the building was built by people of high-status with the financial means to improve a buildings outward appearance. Like the buttress addition, this addition may have been added very soon after construction had finished. It could even be classed as belonging to the construction phase itself if it was not for the fact that it had occurred after the disposition of (4029).

### ***Midden***

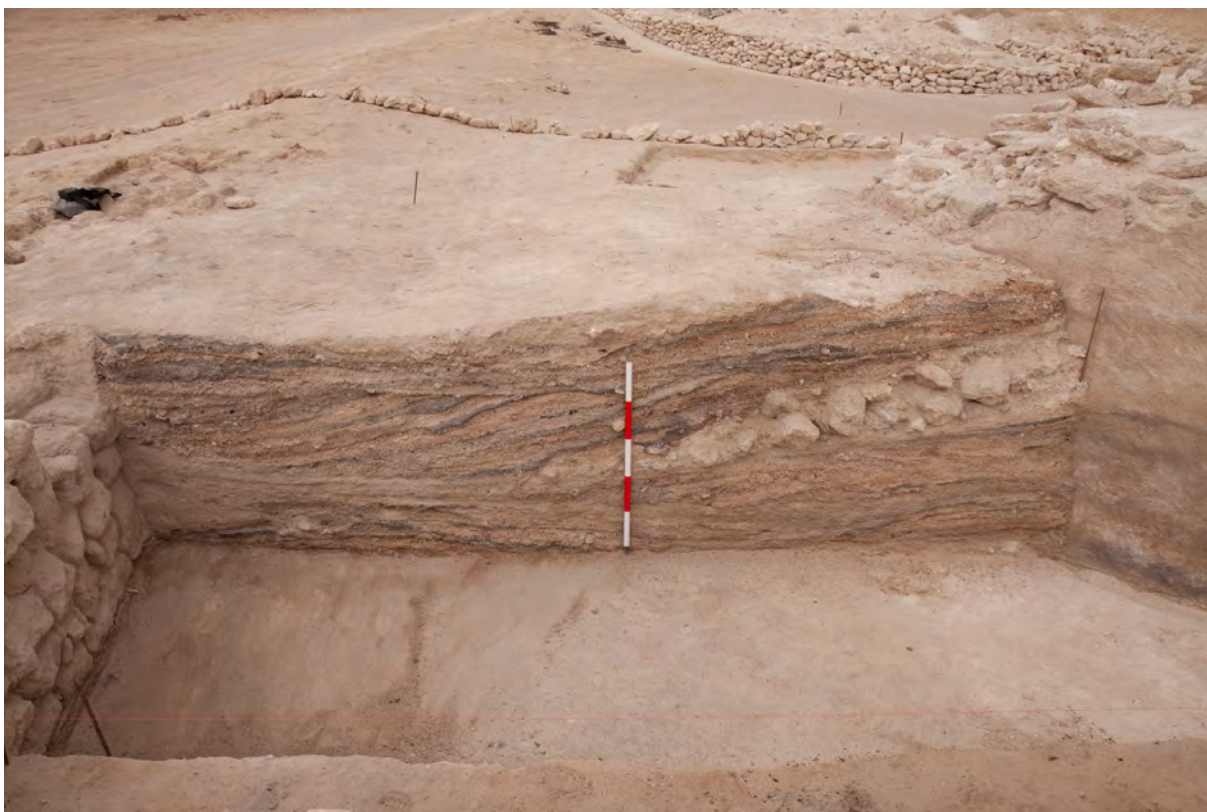
Directly on top of both the buttress and the plaster-rendering episodes lay a series of midden deposits. These were seen purely in the evaluation trench (Spaces 3000 and 3006) and were interpreted generally as deposits of dumped rubbish, presumably from the interior of the precinct (Figures 6.4.3, 6.4.14 & 6.4.15). Both spaces displayed evidence of this dumping, but there is one major difference. Smaller space 3000, the area south of the outer wall in the evaluation trench, merely displays refuse deposition. Space 3006, however, reveals a different sequence where a series of rubble collapse deposits were sandwiched between 2 midden deposition sequences.

In space 3006, the midden deposits were revealed to have been built up against the outer wall (4004). A deposit of brown grey sandy silt indicated a build-up of wind blown sand and was seen underlying a series of four midden deposits (loci numbers 4048-51). All contained pot, glass, shell and bone as well as charcoal and ash. These deposits were believed to belong to the same activities that formed the deposits seen north of the city wall in Space 3006: namely the dumping of hearth material, used floor surfaces and general domestic waste that had originated from the precinct interior.

As previously mentioned, the sequence of deposition in space 3000 differed to that seen in space 3006. Midden deposits (4022), (4024), (4025) and (4028) were dumped down over the tower, the buttress and also the previous deposits belonging to the tower renovations and initial construction phase. Over this lay deposits indicating possible architectural collapse, including layers (4013-14) and (4018-20). Deposit (4019) was interesting because it displayed a significant dump of material similar to that used in the tower's construction, possibly indicating significant tower collapse (Figure 6.4.16). Deposits (4014) and (4013), similar in consistency and colour, were found lying directly above this dilapidation material but directly around the tower base and wall (4010). These deposits indicate a period of architectural decay where parts of the precinct had collapsed. However, they do not indicate the abandonment of the building in total since the subsequent deposition of more rubbish dumps were discovered overlying these rubble layers (see loci. (4006), (4015) and (4017)).

Interesting questions arise from this small sequence since there were no definite explanations for the presence of the rubble. It may suggest an attack from forces strong enough to cause architectural damage but weak enough not to cause the total abandonment of the building. It may also have been caused by deliberate action from occupants of Al Zubārah itself where renovations were made to the structure and waste material was merely dumped and never cleared away. It may also be just explained by mere architectural decay. What can definitely be said is that rubble, similar to the building material from the wall and the tower, was seen slumped against the buildings base, on a bed on domestic waste. This was then covered by more waste, indicating continued occupation of the precinct. Whatever the cause of the rubble, it was not great enough to persuade the occupants of this area of Al Zubārah to move away and discontinue their normal activities.





**Figure 6.4.14 :** Profile (facing east) of midden deposits in space 3006



**Figure 6.4.15:** Profile (facing east) of midden and dilapidation deposits in space 3000





**Figure 6.4.16:** Demolition deposits in Space 3000



**Figure 6.4.17:** Space 3001



**Figure 6.4.18:** *Tannūrs* in Space 3001

### ***Room Occupation Features***

A discussion of the archaeological deposits and features found within the individual precinct spaces is given below, organised by space number.

**Space 3001:** As previously mentioned in Phase 3, this space was separated from Space 3002 by wall sequence <4087>, <4088> and <4093>. These wall segments formed Space 3001's northernmost extent. The southern extent was formed by wall <4010>, the eastern extent by wall (4091) and the western extent by staircase (4084) (Figure 6.4.17). Beneath the demolition/dilapidation deposits (see Phase 1) the floor of this room was covered with a very thin (0.04m) trample layer (4003) in which small pieces of pot, bone shell and plaster fragments were found. Initially, this layer was believed to be part of the demolition deposits above but on closer examination it was discovered that the consistency, colour and thickness of the layer was uniform across the entire space. It was interpreted as a later occupation surface, possibly one of the last in this area, before the building fell into ruin.

Beneath the trample surface were some very interesting archaeological features that defined the entire room. The trample deposit (4003) covered a surface (4052) comprised of very hard grey silty sand. Into this were truncated six circular *tannūr* cuts [4095, 4097, 4099, 4101, 4103, 4105] and a post hole [4107] (Figure 6.4.18). Each *tannūr* truncation had a dark brown/black circumference denoting the remnants of charred and blackened pot. All features in this room, including surface (4052), were left unexcavated and preserved for excavation in the future. These *tannūrs* suggest that this room was used for cooking. The multiple *tannūr* truncations were reminiscent of those found and excavated this season in ZUEP01. Indeed, even though the *tannūrs* were not excavated, a multitude of charred bone could be seen within. The lack of formal doorways and the presence of the possible arch-way indicated by the arch spring in wall segment (4088) suggest this was open to the elements, presumably to allow ventilation. The combination of these features and characteristics suggests that this may have been a cooking and food preparation area.

**Space 3002:** Space 3002 was bounded on the east by wall <4091>, to the south by wall sequence <4087>, <4088> and <4093>, to the west by staircase <4084> and stone plinth <4086> and to the north by the L.O.E.. Only two deposits were identified and only one of those was excavated. The deposit excavated comprised a hard silty sand and contained metal, pot and bone. It is probable that this deposit was a trample layer similar to (4003) in Space 3001, since the two layers were revealed to be at the same level. Beneath this deposit lay another compact silty sand surface. This was left unexcavated and will be examined in a future seasons work. What can be said is that this surface was level with floor surface (4052) in Space 3001. It is possible that these two surfaces were contemporary but further work will be needed here to give a full examination and hence definition.

Both Spaces 3001 and 3002 represent a less sophisticated area within the precinct. The walls on the eastern side showed little sign of plaster work. The floors were rough and unplastered. There are no architectural embellishments in the stone work of the staircase or on the inside of the precinct wall <4010> in Space 3002. With the presence of the unexcavated *tannūrs*, these two adjoining spaces have a functional character, and contrast with the more elaborately decorated Spaces of 3003, 3004 and 3005.

**Space 3003:** The spaces directly to the east of wall <4091> marked a stark contrast to those to the west. Space 3003 was bounded to the south by wall <4010>, to the west by <4091>, to the north by wall <4090> and <4074> and finally to the east by wall <4073>. Beneath the demolition deposits of Phase 1, and in similarity to Spaces 3001 and 3002, a 0.1m trample layer of light brown silt sand covered the entire floor. This deposit (4026) was interpreted as a thin occupation layer and contained quantities of pot, bone and shell. It was firmly compacted onto a smooth light grey plaster floor, which towards the eastern end had been very partially damaged revealing stonework below, similar to that seen in Space 3005. The plaster covered all four walls as well as coating the threshold feature <4077>, indicating a high status living area (Figure 6.4.19).

The doorway of this space was interesting since there was a clear rectangular depression set into the plaster of the floor. Within this depression lay a thin layer of beach shell (4056). This was the only evidence of a shell surface contained within this room, which appears strange since the neighbouring Space 3004 had a similar plaster floor that had been entirely covered and recovered with beach shell. However, it would seem likely that a depression set directly into the plaster floor would indicate the presence of another feature – in this case the shell deposit (4056). It perhaps indicates a transition between the two spaces. In this case, it could be compared to a modern day “doormat”.

Directly beneath the shell deposit lay two post holes (feature’s [4063] and [4065]) set directly into the left and right corners of the doorway. These represented spaces to insert a doorframe (Figure 6.4.19). Clearly this room marks a stark contrast to spaces 3001 and 3002. It had plaster floors, a feature to indicate a transition from one room to another and evidence of a doorframe clearly demonstrating the expenditure of great effort and resources. Indeed, even the walls of this room showed some form of decoration. The southern wall <4010> included two niches <4110> and <4109> comprised of ledges of coarse pink-brown lime plaster, similar to the plaster seen used in the floors and the walls. Additionally, a similar feature was seen evident in the western wall <4073> and was interpreted initially as a window through to Space 3005 which had been blocked up to form a niche. Examination of this from the other side of the wall in Space 3005 displayed no real evidence of repair. It is therefore likely that this feature was built deliberately and set back from the wall face.

**Space 3004:** Space 3004 was bounded in the north by walls <4079> and <4070>, in the east by walls <4072> and <4073>, in the west by <4091> and finally in the south by <4090> and <4074>. It shared many similarities with Space 3003, having a hard light pink grey plaster floor <4061> along with plastered internal wall faces. However, unlike space 3003, it contained two occupation deposits that spanned the entire floor surface. Directly below the demolition/dilapidation deposits of Phase 1 was a layer of brown grey beach shell (4055). This was sieved for finds revealing occupation debris in the form of pot, bone, metal and glass bracelets. Beneath lay another similar shell layer (4060) (Figure 6.4.20) which became extremely hard towards the bottom as if the shell was stuck to the floor itself. This may have signified tread where use of the room had compacted the initial shell layer into the plaster. Interestingly, the entrance made in the northern walls <4079> and <4070> seems to lead directly outside into a courtyard space, seen represented here by plaster floor (4078). It is possible that space 3004 represents a transitional area between the exterior courtyard unexcavated this season and Spaces 3003 and 3005. The shell layers could denote surfaces that would facilitate access between a dusty outside area to a clean plastered floor area. Both Spaces 3003 and 3005 contained no





**Figure 6.4.19:** Threshold area in Space 3003



**Figure 6.4.20:** Shell deposit (4060) in Space 3004





**Figure 6.4.21:** Decorative plaster work at the doorway linking Spaces 3003 and 3004



**Figure 6.4.22:** Decorative plasterwork from doorway linking Spaces 3003 and 3004



**Figure 6.4.23:** Space 3005

similar shell deposits. They were rooms connected to an area that was semi-exterior/semi interior – like a modern day porch although much bigger and grander. The entranceway in walls <4079> and <4070> seems wide and open, showing no signs of doorframes or signs that the room could be closed to the outside. Moreover, remains of collapsed arch/ceiling-vaulting material (4045) (discussed later in Phase 1) were discovered lying directly over this entrance, indicating again that Space 3004 had an open entrance. Here, then, is evidence of a major exterior space leading into an interior space that was both open to the outside and also a passageway through to clearly defined interior spaces.

Two other features from this room need to be discussed. The first is a possible blocked doorway in the far western wall <4091>. There is definite disturbance in the matrix of the wall here but the material used to block any possible doorway only extends to a point approximately 0.25m above the floor level. If this had been an original doorway, the threshold would have been unnaturally high. Examination of the other side of this wall also indicated that signs of a blocked doorway were vague at best. It seems that this was merely a repair to the wall, and not a definite entranceway between Spaces 3002 and 3004.

The second feature focuses on decorative plaster work found on wall <4074> surrounding the doorway, linking Spaces 3003 and 3004 (Figure 6.4.21). Surviving remnants still existed on this wall within Space 3004 but better examples were rescued which had fallen off in the later dilapidation phases (Figure 6.4.22). Once again, this evidence indicates a high status structure, and whoever built this had the financial means to fund and incorporate lavish decoration into the most simplest and basic of features. This also points to the idea that the clean beach shell-less Space 3003 was an important interior room since the entrance into it was lined with beautiful plasterwork.

**SPACE 3005:** Space 3005 was bounded in the east by wall <4071>, in the north by <4070>, in the south by wall <4010> and in the west by walls <4072> and <4073>. This room was by far the most interesting (Figure 6.4.23). Against the southern end of the room was a *madabes* <4042> along with an accompanying storage jar (4043). The date-press was similar to those found in areas ZUEP01 and ZUEP02. At the northern end of room 3005 lay a plaster-lined basin <4041> together with a drain, which ran down out of the space and beyond the L.O.E. These features lay on a floor <4040> constructed of predominantly limestone flagstones, although some were beach stone, which was then covered in a coarse pale grey plaster. The flagstones were similar to those partially revealed under the plaster floor in Space 3003 and were seen easily since the plaster had been highly eroded. The plaster erosion may have been explained by the room's constant use.

The date press consisted of seven fragile plaster channels running north/south which collectively emptied into a main collection channel running east/west, parallel to wall <4010> (Figure 6.4.24). The seven channels all dropped subtly in level to allow fruit liquor to drain into the main east west channel. This in turn dropped towards the northeast end; ensuring liquid would flow down towards the storage jar. The date-press storage jar, encased in a smooth squat square plaster block, was situated at the northeast (Figure 6.4.25) and, although a separate feature, seemed joined to the press itself. Liquor would therefore flow down the channels to the northeast and into the jar, which had a small hole in the rim to facilitate the passage of fluid. Since the jar was both permanently set into the actual floor and joined to the date-press, pouring liquor out of the jar would have been impossible. Fluid may have therefore been ladled out into separate vessels. The date-press channels were filled with a fine grey silty sand (4038) which was comprehensively sieved and sampled for finds. Small pieces of





**Figure 6.4.:** The date-press <4042>

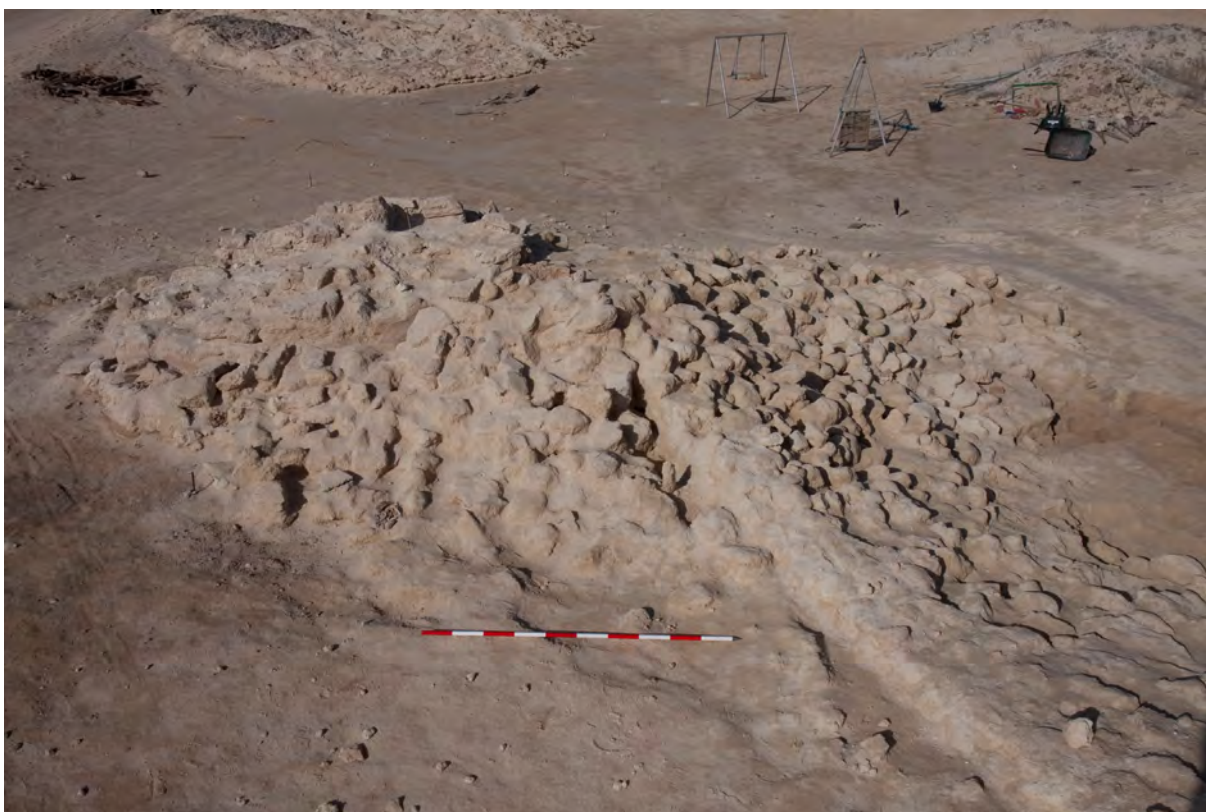


**Figure 6.4.25:** The date-press storage jar (4043) set into the floor surface and encased in a plaster block





**Figure 6.4.26:** Shattered pottery lying on the floor surface of space 3005



**Figure 6.4.27 :** Rubble dilapidation and demolition covering the tower and spaces 3001-2





**Figure 6.4.28:** Collapse arch/ceiling-vaulting material (4045)

plaster with the indentations of palm leaves were rescued indicating that this vegetation had been used to sieve the date juice. The *madabes* characterises and dominates this space – all other features seemed to have been built to provide support for it. The plaster basin <4041> in the north, along with its accompanying drain system, was believed to provide washing facilities for users who were covered in sticky date liquor. It was dismissed as a latrine, since it would hardly be hygienic to place facilities in a room dedicated for food production.

The floor seems to have been degraded due to the constant use of this room. Over the floor lay deposit (4037) consisting of grey medium compacted silty sand. Interestingly, careful excavation of this deposit revealed large amounts of shattered pot, some of which appeared unfired (Figure 6.4.26). These broken jars may relate to the vessels used to transfer the date liquor out of the room. This occupation deposit covered the entire floor of Space 3005 and continued right up to threshold <4075>. All four wall faces of this room were plaster covered, similar to those found in Spaces 3003 and 3004. Similar to Space 3003, the northernmost wall <4070> contained a niche comprised of light grey smooth plaster. This did not extend across the entire width of the wall, indicating that it was a niche rather than a window. Once again, more evidence of high status occupation is demonstrated through these features. Space 3005 contains all the lavish accoutrements of Spaces 3003 and 3004 and the functionality of Space 3001. It was geared to food production in a high status area.

### 6.4.5 Phase 1 - Collapse

The last phase in this ZUEP04 incorporates deposits and features pertaining to the decay and dilapidation of the precinct building and the outer city wall.

Outside of the palatial compound, dilapidation and collapse deposits are represented by loci numbers (4005), (4009) and (4046). Deposit (4046) was a layer of rubble from the outer city wall, lying at the top of Space 3006. This in turn was overlaid by the modern road surface. In Space 3000, deposit (4005) represented the dilapidation of both the buttress <4011> and the outer city wall <4004>. At the northern end of the trench, a deposit of compacted wind blown sand (4009) lay directly beneath the main architectural dilapidation deposit of (4001). The windblown sand highlights that there was some form of inactivity or abandonment here before the tower and wall collapsed since the deposit seals the midden tip layers beneath. The main windblown sandy overburden layer (4000) then covered these spaces entirely.

Similar dilapidation deposits were evident inside the palatial compound. Space 3001 was totally covered by rubble deposit (4002), presumably material that had fallen from the top of the tower, the staircase and the surrounding walls. Pot, bone, metal, massive roughly hewn limestone blocks and plaster fragments were all found within this deposit. This space and Space 3002 were then covered by the main demolition deposit (4001) (Figure 6.4.27) and the subsequent wind blown sand overburden layer (4000). There was really little difference between the rubble demolition in (4001) and (4002) except that deposit (4002) was confined within the boundaries of space 3001 and did not spread out over a large area.

Rubble collapse deposits signifying dilapidation were represented in Space 3003 by deposit (4023), in Space 3004 by deposit (4021) and in Space 3005 by deposit (4031). Directly to the north of Space 3004 was a separate collapsed feature that must be discussed. This was the remnants of an arch and vaulted ceiling (mentioned briefly in Phase 2), which had either toppled down from the edge of space 3004 or indeed fallen directly down from the above plaster floor (4078) (Figure 6.4.28). It deserves mentioning since it displayed once again evidence of high status living. The arch was constructed from the same grey pink plaster seen so often on the walls of the precinct rooms. This surrounded and bound small blocks of white quartzite, which reflected the light like minute shards of a broken mirror. This was probably used to create maximum effect and was seen nowhere else on site, suggesting it may have been a luxury material. The remnants of the ceiling vaulting and large slabs of probable vertical plaster facing were, in places, seen to be held together by slats of very thin wood, seen evident when the plaster fragments were broken in two. It seems likely that these slats served as support for newly rendered plaster which was applied to a wall face to create fine smooth and sometimes patterned surfaces. The collapsed arch/vaulting serves as the last reminder that this precinct building was built by someone who had resources enough to fund expensive architectural design work. Like all the other spaces in ZUEP04, Space 3004 and its collapsed ceiling was covered by windblown sand overburden deposit (4000).

#### 6.4.6 Conclusions and Recommendations

The excavations in ZUEP04 achieved its three objectives. Investigations revealed a monumental tower structure, over 2 metres in height and 6m in diameter which formed a strong defensive position, which was tall enough to require internal structural support and built at the same time as the outer city wall. The structure contrasted to the other towers excavated at Al Zubārah since it showed no signs of an outside spiral structure to gain access to the top. Instead, a massive masonry stair case provided access from within the compound. The tower seemed well placed in relation to the city wall to add additional defences and displayed signs of high status construction materials and building techniques.

The midden was formed directly outside the tower slumping down to the outer wall. In profile, it contained striations and lenses of charcoal, dumped sandy shell and ash, dispersed regularly with huge amounts of fish and mammal bone, along with broken ceramics. The evaluation trench excavated was a definite success since it enabled the discovery and subsequent recovery of early dating material. Moreover, both Spaces 3000 and 3006 highlighted city defence renovations which could not be seen from just mere surface observation.

Excavation of the compound rooms displayed evidence of high-status living, on multiple levels and within large decorated spaces. The spaces were divided into two groups, aptly separated by the main north/south wall (4091). Spaces 3003-5 can be described as far better decorated and lavish than spaces 3001 and 3002. The plaster floors, the vaulted ceilings, the plaster wall decorations and the shell occupation layers all point to high-status domestic life. The spaces west of the main dividing wall seem more functional and basic. These two areas as a whole collectively depict the precinct as a self-reliant entity. The *tannūrs* and the date-press, features seen elsewhere in Al Zubārah in ZUEP01 and ZUEP02, point to the idea of self-sufficiency in domestic production. This may indicate that the compound was able to operate independently away from the machinations of daily life further away in the town.

Regarding future works at this precinct, an examination of the digital survey map is useful (Figure 6.4.1). The compound appears to be divided into 8 courtyard, which appear to be accessed by streets. Each courtyard appears to be surrounded by rooms following a similar pattern to those excavated in ZUEP04 (2 spaces which both have their eastern and western extents bound by the presence of one separate room). It would be useful to characterise one whole section of this compound to provide an example of the general domestic structures and activities that were found within the compound. This would also illuminate any particular features stationed within the courtyard like access to wells, evidence of podiums etc. One possible problem that could be encountered here is that the southwest section is not typical since part of it incorporates a defensive tower. Given that the time taken to excavate the rooms in EP04 was relatively short, a lot of ground may be covered, enough possibly to venture into areas that did not incorporate a massive tower. The most interesting area of the whole precinct is the central courtyard itself and the buildings directly linked to it. It would be great to understand what role it played in relation to the whole precinct in general.

These new excavations would obviously propagate new questions and thereby provide more work. There are of course unanswered questions from the excavations made this season. How large is the midden? How far does the buttress feature <4011> support the outer wall – does it support just a small portion, as revealed in Space 3006, or does it stretch further along the outer town wall? Is

Space 3002 a room or the beginning of a courtyard space? Where do the stairs <4080> lead in the east and what kind of first floor structure can be revealed by excavating them further? What are inside the *tannūrs* in Space 3001? These questions could be answered in conjunction with the excavation of the south western section of the compound, creating a greater understanding of this portion of the precinct in general. Future excavations will undoubtedly extend our understanding of the precinct and hence Al Zubārah itself.



## 7. Qal'at Murayr

Gareth Rees

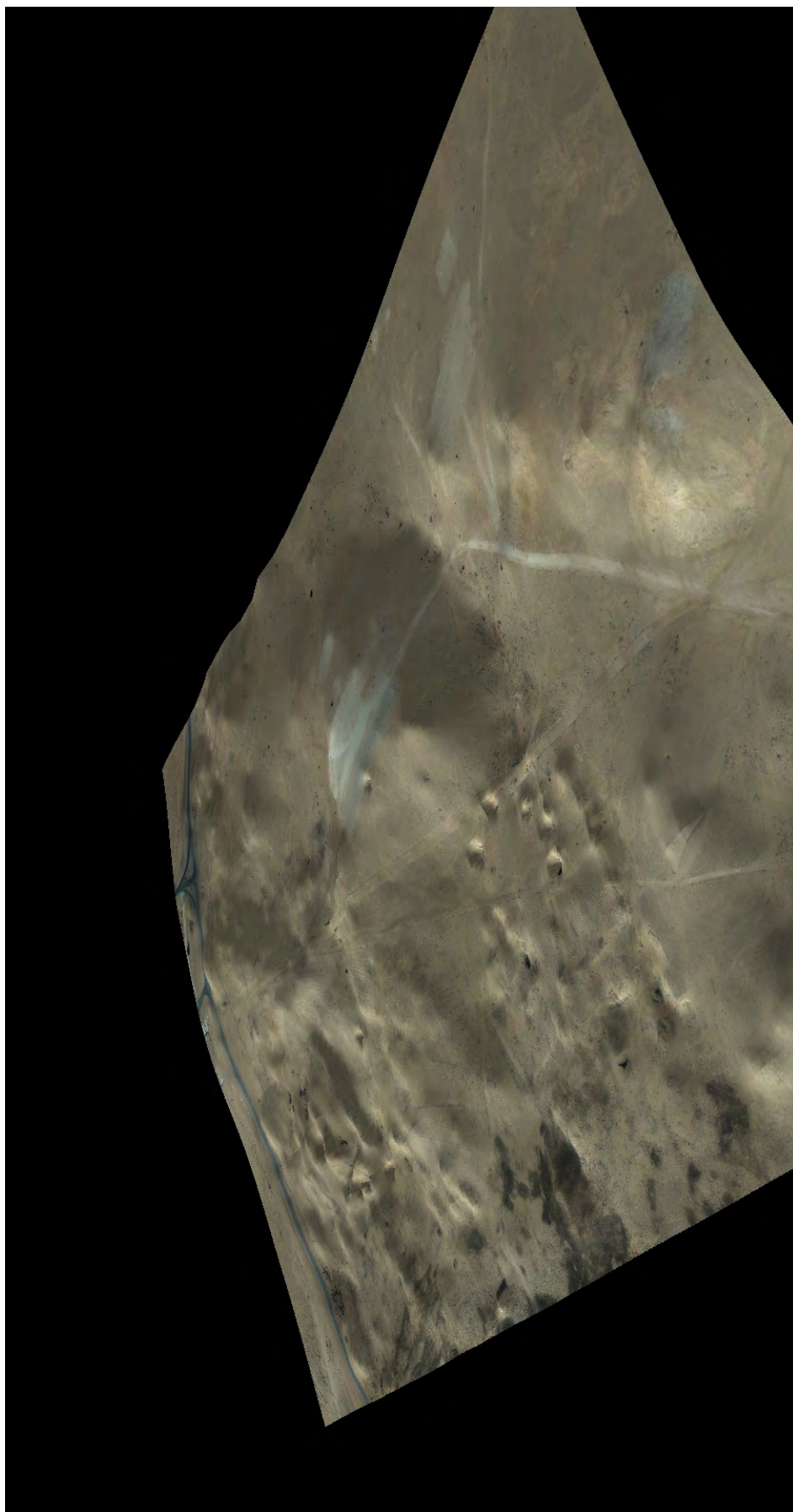
### 7.1 Introduction

Work at Qal'at Murayr aimed to locate and characterise the remains of the fort known to have existed somewhere within the area opposite the extant Zubārah fort, to the east of Al Zubārah. The former core of Qal'at Murayr was identified to be situated adjacent to the modern road with buildings spreading south and west up to the limits of the *sabkha* and continuing across flatter terrain to the east. The total area surveyed and encompassed 73.4ha and was carried out with a TST total station, and also involved evaluative excavations. Excavations (labeled Murayr Excavation Points - MUEP) aimed to characterise the age and depth of surviving deposits and also to clarify the location of the fort complex. In all, twelve trenches were opened: seven within the suspected fort complex (MUEP01-05, MUEP07-08), one over a building outside of the main complex (MUEP06) and four in an area of hard standing to the south east (MUEP09-12).

The survey revealed three areas of structural activity including the walled fort complex to the north, several buildings lying just outside of this wall to the south, and a series of enclosed structures at the far south of the study area. A cemetery of at least 50 graves was recorded, as were eight wells. Nine hectares of mechanical disturbance were identified in a band across the centre of the site running from south west to north east. Six large, sub-rectangular deposits of shell were located on higher ground to the east and appeared to overlie all other archaeological features. These deposits had probably been excavated from the current beach and palaeoshoreline.

### 7.2 Topography and Setting

Qal'at Murayr is situated at the point where the land rises steeply out of the *sabkha* up to the mid Holocene shoreline (Macumber 2009, 16). This is a change of 4.5m, from 1.2m above local datum (A.L.D.) to 5.7m A.L.D. over a distance of around 300m from east to west. This slope is at its steepest when approached from the west and south west, with the same increase in height being achieved over a distance of 700m when a transect is taken from south to north. The fort complex was located on this high ground to the north west of the surveyed area (Figure 7.1). The land to the north and north east of Qal'at Murayr rose by a further 3m towards the site of the current extant fort. Significant topographic change was encountered toward the east of the site where three promontories, capped by recent shell deposits rose to heights of around 7.5m. This undulating landscape with occasional steep relief rising or falling over 2-3m, continued to the east of the surveyed area. To the south the land dipped into a spur of *sabkha* before gently rising towards the southern horizon. The landscape and archaeology of the survey area were characterised predominantly by their relationship with the *sabkha*. This location at the palaeo-shoreline, from where views of the surrounding landscape were unhindered, appears to have been an ideal strategic location for a settlement. In general all enclosures and buildings identified, even those on the lower ground, were located on slight rises in the landscape sometimes as little as 0.4m above the surrounding terrain. This presumably reflects both the unpre-



**Figure 7.1:** Terrain model overlay by current setting of the survey including QMA archaeological area

dictable nature of the generally moister and still occasionally flooding *sabkha* and the relatively impermeable nature of the ground.

The modern setting of the survey area is one of a rocky desert. The boundary of the survey area was set to the north by a fence that cut through many of the archaeological features (Figure 7.2). This fence was built by the Qatari Ministry of Environment to ensure that camel herds did not wander on to the road north of the fence. The road is also a post-1960s addition to the landscape which has impacted and disturbed a part of the site (see Section 2 and Figure 2.4). This is particularly apparent when the screening walls that run from Al Zubārah are followed westwards towards Murayr, which were entirely truncated by the course of the road and its surrounding easement.

The site is accessed by a gate opposite the modern fort which leads on to a track that appears to have been bulldozed through the landscape. This track, which measured c.7m wide, runs down slope from north to south before joining the well preserved remains of a camel racing track which can be seen clearly on aerial images. Other temporary tracks criss-crossed the entire site including the building remains in the fort area. These tracks, caused by 4x4 vehicles, continue to be made up to the current time and add significantly to the erosion of any surviving features.

Prior to the current phase of work at this site the area had already been recognised for its archaeological potential and a boundary had been placed around it by the QMA. This boundary was marked by road irons set into concrete topped by red tape. They were surveyed during the initial stages of the current project in order to ascertain if all surviving remains had been encompassed by it.

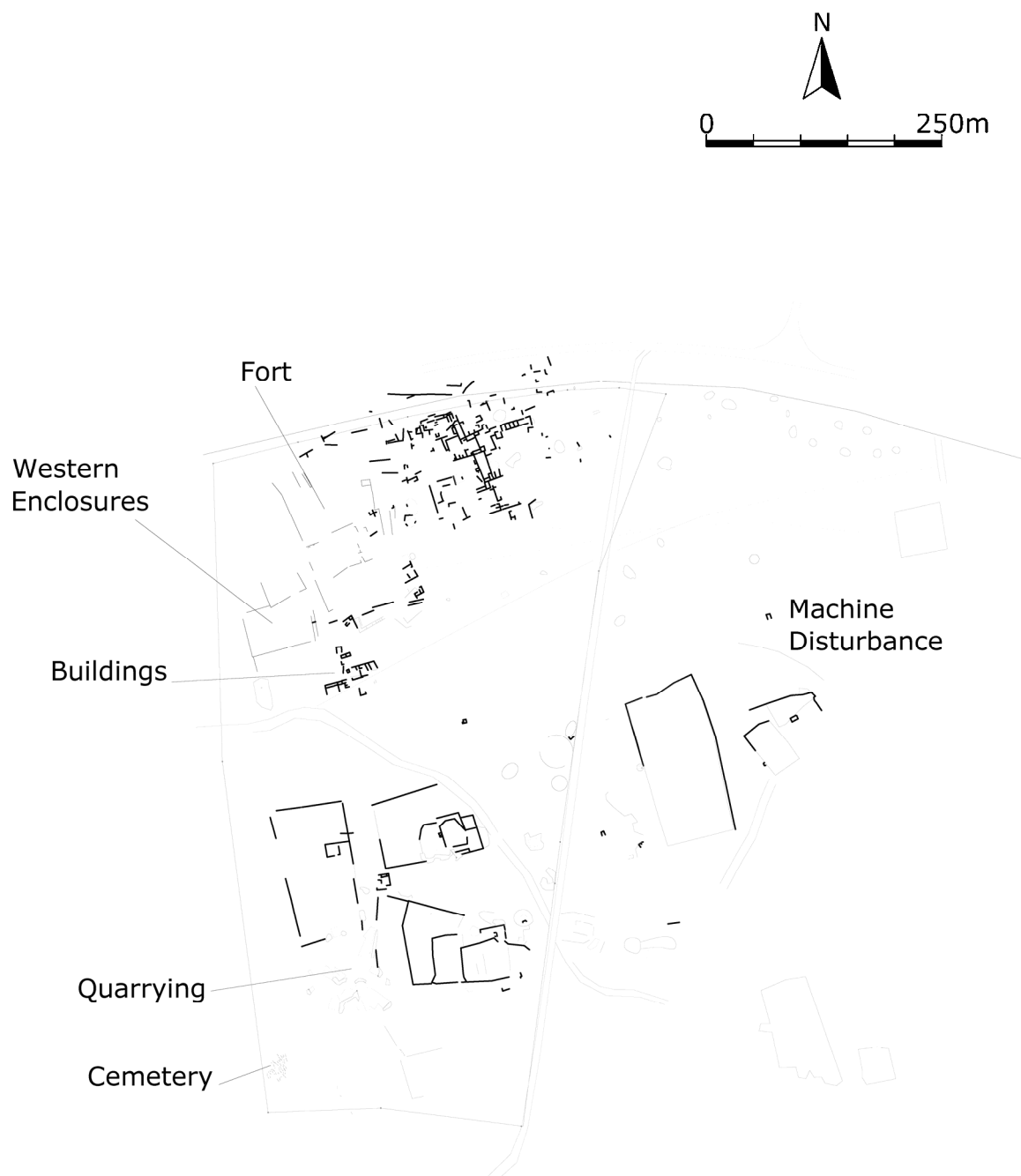
## 7.3 The Survey

The survey was undertaken using a Leica 1203 TST total station set up on a base line (stations S101 and S102) using a local grid system and QNG height data traversed from a nearby datum point. Three subsidiary stations were set out directly from this base line (S103, S104, S105).

All identified features were surveyed regardless of form, function or relative phasing in order to provide an objective account of the current state of preservation, occupation and use of the landscape surrounding Qal'at Murayr (Figure 7.2). Features were identified over an area that measured 917m from west to east and 973m from south to north. Four primary areas of activity have been identified based on associations on site and aerial photographic information. The area to the north west can clearly be seen on the 1958 photograph (Figure 2.4). as the location of the main structures of Qal'at Murayr and for differentiation from the site as a whole has been called 'fort' below. To the south west of the fort complex a series of walls and associated features were identified that are described separately. Further to the south three large enclosures were recorded whilst at the far south western corner of the survey area a cemetery was located. In the centre of the survey area and continuing in a band to the north east was evidence of extensive landscape remodelling that overlapped with the fort complex itself.

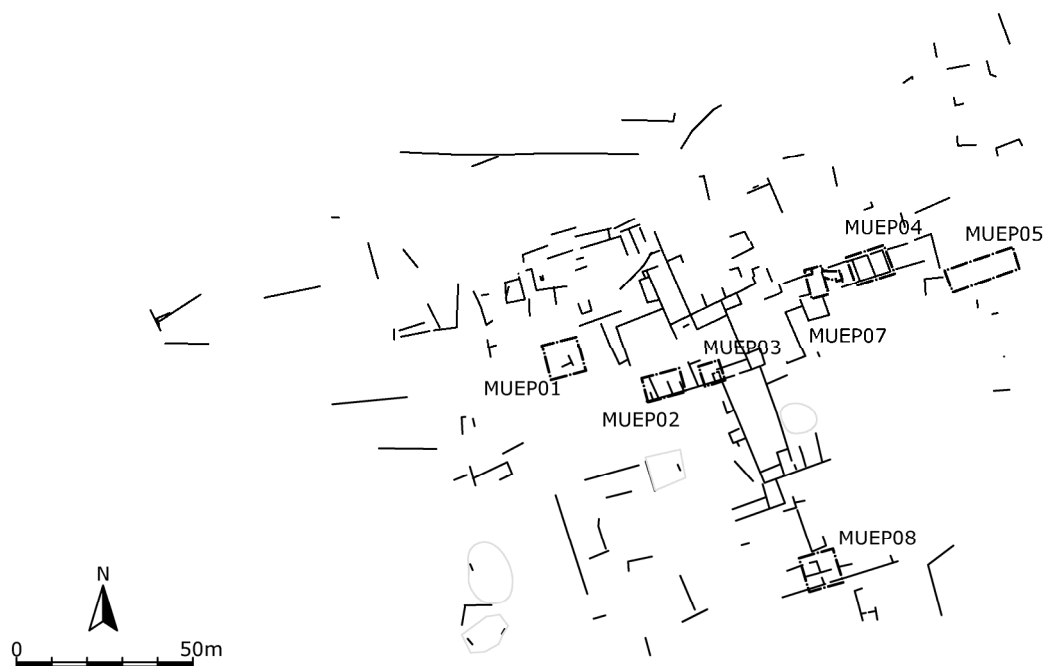
### 7.3.1 The Fort and Associated Features

Considering the scale of activity visible in the 1958 photograph, very few surface remains of the fort survived with a single wall constituting the remaining standing remains of the site. An initial walk-

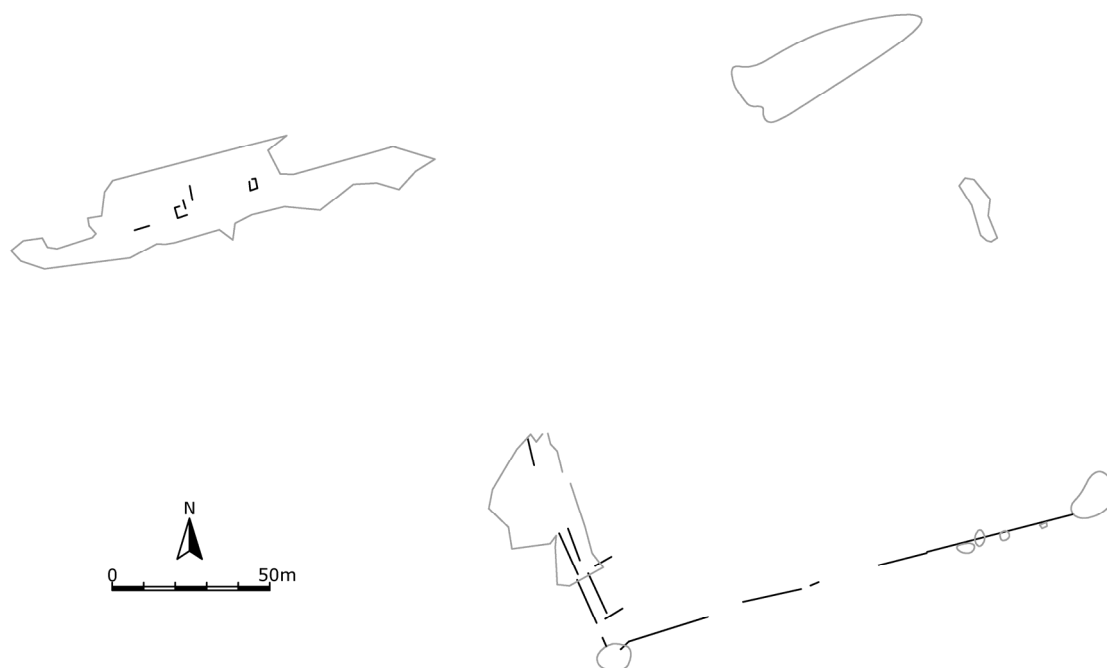


**Figure 7.2:** Plan of Qal'at Murayr showing all archaeological features recorded during the total station survey





**Figure 7.3:** Plan of the fort complex showing excavation trenches



**Figure 7.4:** Plan of the outer wall of the fort.

over survey revealed the partial remains of the outer wall of the fort as well as walls of buildings that lay within the wall (Figure 7.3 & 7.4). Spreads of rubble over the area may indicate the location other buildings as well as the probable course of the main defensive wall.

### **7.3.2 The Outer Wall**

This area of features was bounded to the south and south west by the fragmentary remains of a wall and a large amount of rubble from its collapse (Figure 7.4). A section of this wall ran for 70m from NNW to SSE. The remains of this were at least 4m wide and consisted of 2 stone containing walls probably with a rubble core (Figure 7.5). This section of wall came to an end at a sub-rounded mound of rubble that rose sharply 1.7m up from the land to the south. This mound had a diameter of 10.5m and, given its location at the junction of two walls, it is likely to have been the south western corner tower of the fort (Figure 7.6).

Evidence of a substantial wall continued ENE from this mound for another 149m with preservation being best further to the east. Only a single wall line, 1.8m wide, was identified here, but the breadth of the associated rubble spread may indicate that the original structure had a width of at least 5m. Another rubble mound was located at the far eastern end of this segment of wall. This measured 13.8m from south to north and 13.2m from west to east. This mound was surrounded by rubble on all sides and so had less vertical definition than that at the western end, but given its location is likely to represent the footing or foundations for a tower.

No NNW return of this wall could be identified continuing from this rubble mound. The only evidence of the eastern section of this outer wall was a spread of rubble 6m wide and running 21m from SSE to NNW that appeared to bound the structural remains to the west. This feature was investigated and characterised in trench MUEP05 by the removal of overburden; the feature itself remains unexcavated. Two large mounds of rubble outside of the modern fence and adjacent to the road may represent the remains of the northern wall. The mound to the east measured 61m ENE\WSW by 17m whilst that to the west measured 132m ENE\WSW and was 24m wide. Only very fragmentary segments of bonded wall material remained within this rubble.

### **7.3.3 Internal Structures**

Lying within the features identified as the exterior walls of the fort were the remains of a complex of structures that survived at the level of the current ground surface or just below it. It is not possible to estimate how many rooms were present in this complex given that only fragments of walls were exposed. The complex as a whole measured 134m from SSE to NNW and 152m from WSW to ENE, covering an area of 1.8ha, which seems to represent the interior of the fort. It was comprised of several phases of stone built walls up to 0.8m wide that were roughly aligned with the outer walls of the fort. Construction methods within this complex appear to have been relatively uniform with an unworked stone outer shell filled with a core of smaller stones, supported on the exterior by a render of gypsum plaster. Stones in these walls rarely exceeded 500mm in length with those in the core being no more than 200mm. The character of the building remains within the fort was established through a series of trial trenches that aimed to uncover the extent, depth and date of the surviving structure.



**Figure 7.5:** Western section of Outer wall. Facing SSE



**Figure 7.6:** South western tower. Facing north

## 7.4 Trenches MUEP01 and MUEP02

Trenches MUEP01, 02 and 08 were excavated only to the upper archaeological levels in order to ascertain the extent of the occupation and survival of archaeological deposits and features within the fort.

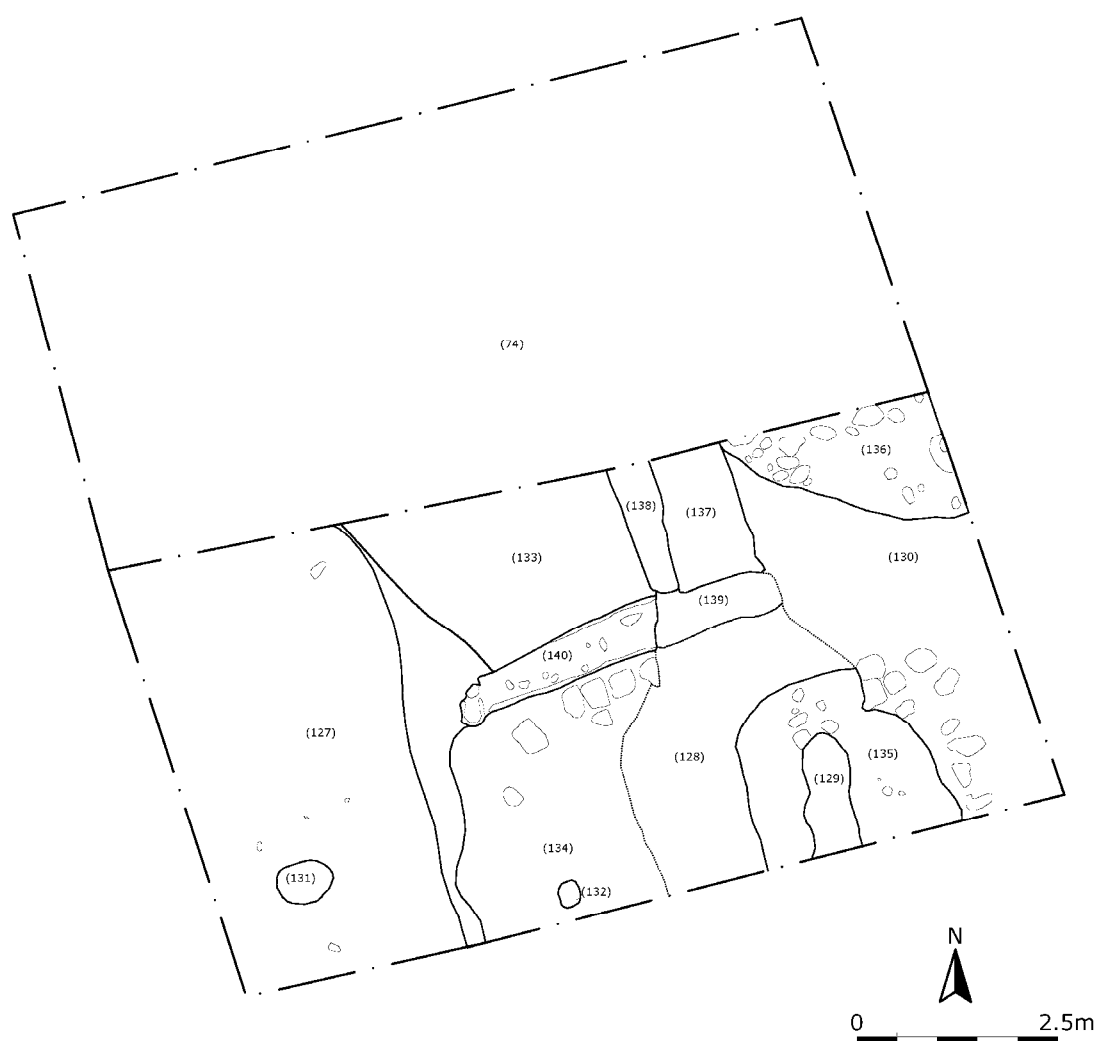
MUEP01 was located on the west facing slope to the west of the building complex and measured 10m by 10m. No remains were evident on the surface. This trench was excavated to a maximum depth of 0.28m. Overburden (63) was removed down to a layer of stone rubble that made up 35% of locus (73). The soil matrix was a mid reddish brown and was very similar to the overburden. Removal of locus (73) revealed another fine reddish silt layer that contained fewer inclusions and may have been the result of wind and water-borne accumulation on this slope (74). These layers masked the surviving archaeological remains which consisted of a wall <140> and the possible remains of a robbed wall (138) (Figure 7.7). These were associated with several phases of mud surfaces (127, 128, 129, 130) and charcoal rich deposits that may have related to occupation (134, 135). Wall <140> exposed in this trench was 0.5m wide and 2.4m in length. It consisted of a mortar and rubble core and was faced with lime mortar on both its north and south faces. Four sandstone blocks appear to have been laid abutting this wall to the south and may represent the remains of a surface (Figure 7.8). Wall <140> probably turned and continued north as <138>. There was no evidence of a westerly continuation. It seems likely that only the lowest sections of this wall survived and given that very little building stone remained it is possible that this wall was robbed before the levelling of the rest of the site. The thick accumulation of silt (74) below the upper rubble (73) supports this.

Located 16m further east, MUEP02 measured 11m ENE\WSW by 7m NNW\SSE. It was targeted over an area where no walls could be clearly defined on the surface, but plaster wall lining could be seen protruding through the overburden. Only 0.1m of overburden were removed in this trench before archaeological layers were appeared (Figure 7.9). Wall <10> consisted of four lengths of wall bonded together and plastered with lime mortar. Only a small amount of the stonework was uncovered at this level and this consisted of irregularly shaped unworked limestone blocks. Two spaces were defined by the N\S segments of wall 10. The northern extent of these spaces was not identified. The western space was 5.7m wide whilst that to the east was 3.3m wide. Locus <32> within the eastern space may have represented a degraded, laid stone floor (Figure 7.10). Both spaces predominantly contained a rubble fill (11) that was not removed; characterisation of the extent of these remains having been fulfilled by the removal of the overburden. Another wall <12> may have formed a thin partition wall that was a later addition to this space.

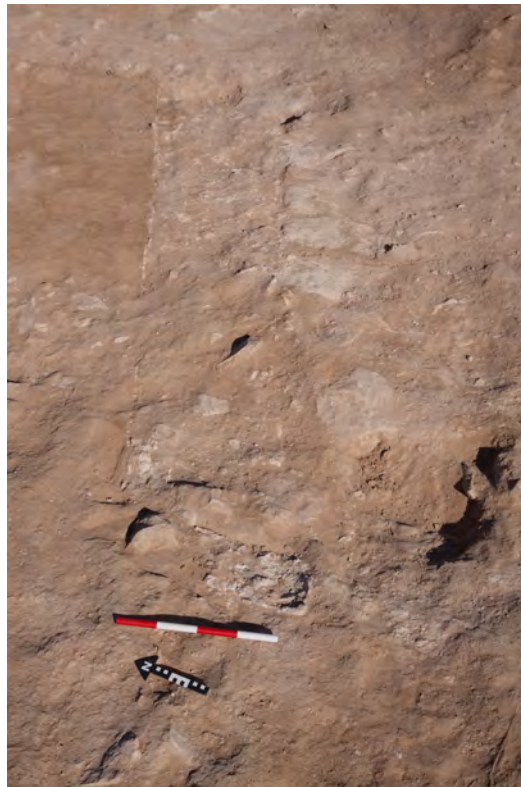
### 7.4.5 Trench MUEP08

Investigation of the extent of the building complex to the south was the aim of MUEP08. This trench was located 15m within the rubble of the outer wall and measured 10m by 10m. After the removal of 0.05m-0.10m of overburden (64) four cellular spaces were identified all measuring 2.6m from north to south (Figure 7.11).. The walls were constructed in a similar way to those seen in other areas of the fort. The south west Space 14, bounded to the south and east by wall <106>, appears to have been an internal space. A thick (25mm) lime\cement plaster <107> had been applied to the north and west

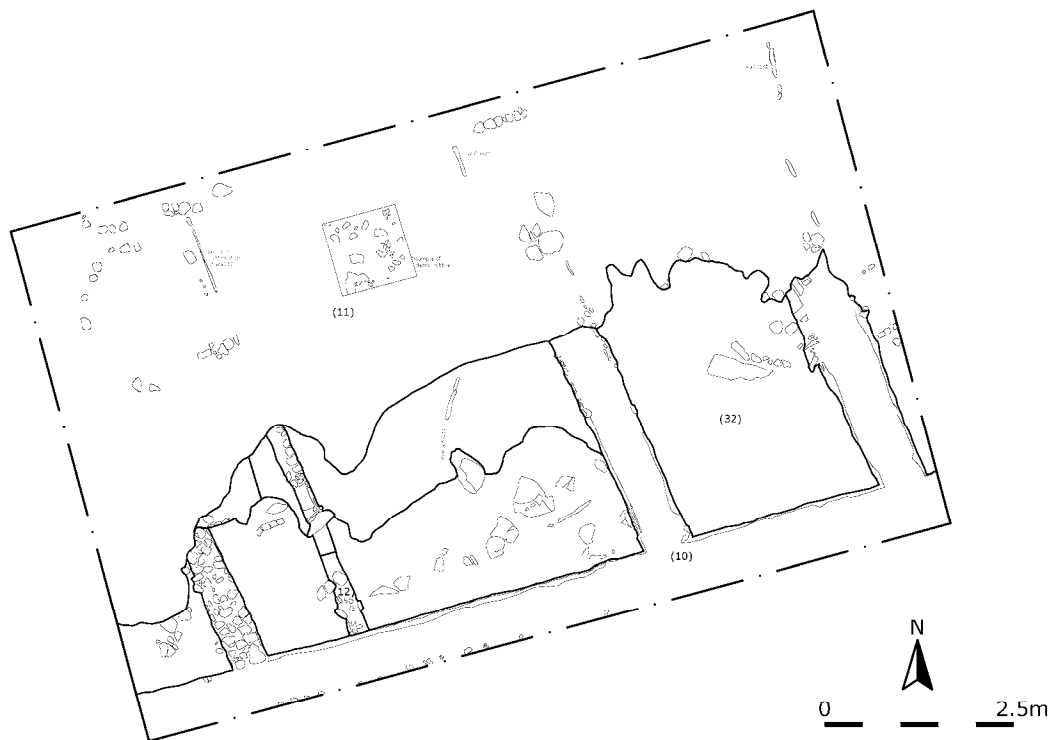




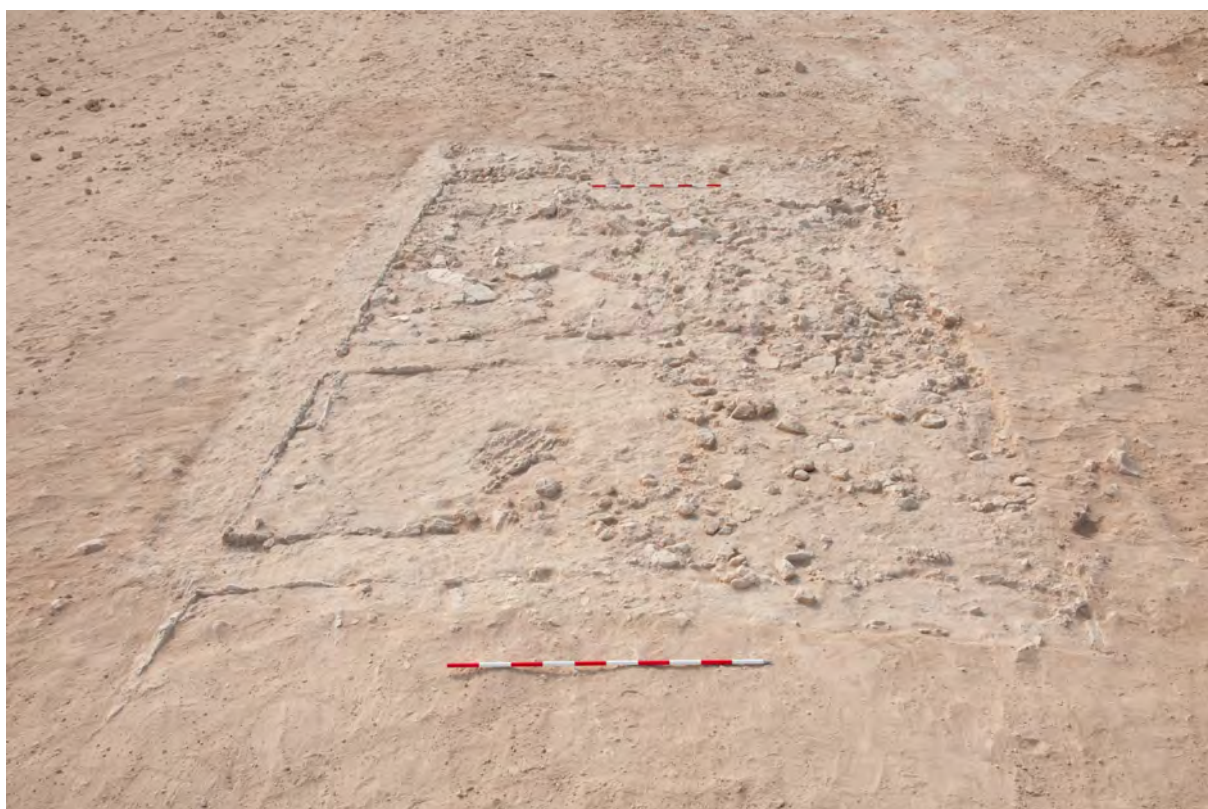
**Figure 7.7:** Plan of MUEP01



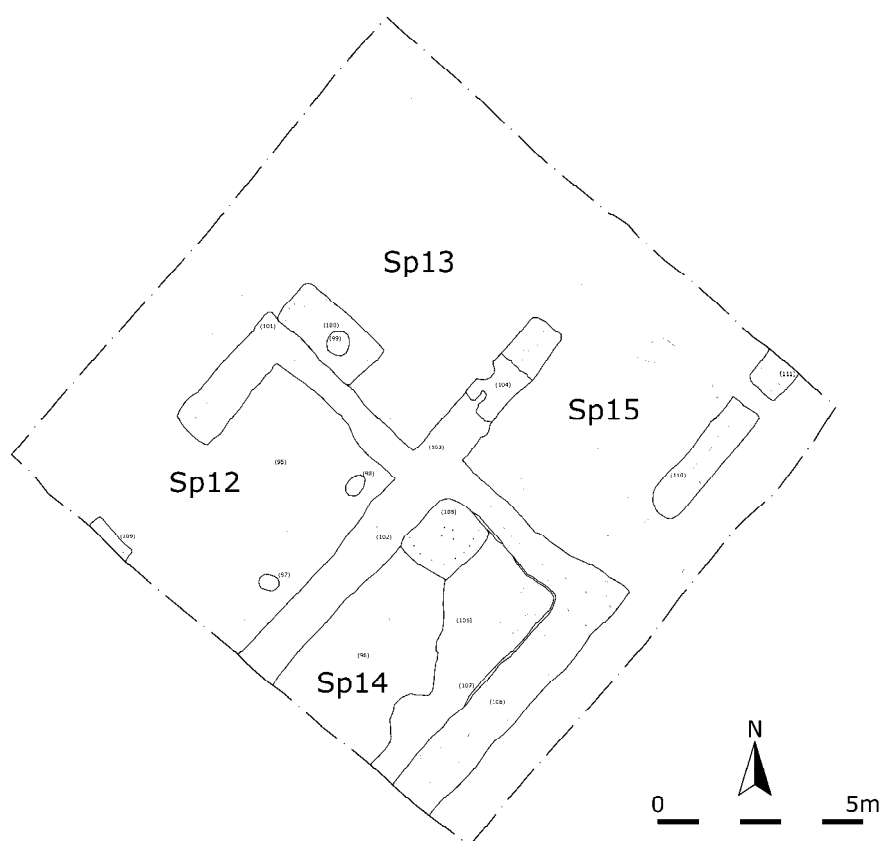
**Figure 7.8:** Sandstone surface abutting wall 140 in MUEP01



**Figure 7.9:** Plan of MUEP02



**Figure 7.10:** MUEP02 post excavation, locus (32) in foreground. Facing west



**Figure 7.11:** Plan of MUEP08





**Figure 7.12:** Drainage installation <108>. Space 14, MUEP08



**Figure 7.13:** Wall <101>, Space 12, MUEP08



faces of wall <106>. This lining was seen to turn and begin to follow along the face of the south facing wall before it became too degraded to follow.

After the application of this plaster a basin lined with a similar material had been constructed in the north eastern corner of the room abutting wall lining <107>. This basin <108> had a lip of 200mm around the west and south edges (Figures 7.12). There was a curved rim inside the lip at the north eastern corner. The basin sloped to a lined sub-rectangular drain in the centre that was 170mm wide. Rubble layer (105) abutted this basin at this level and presumably overlay associated surfaces and features.

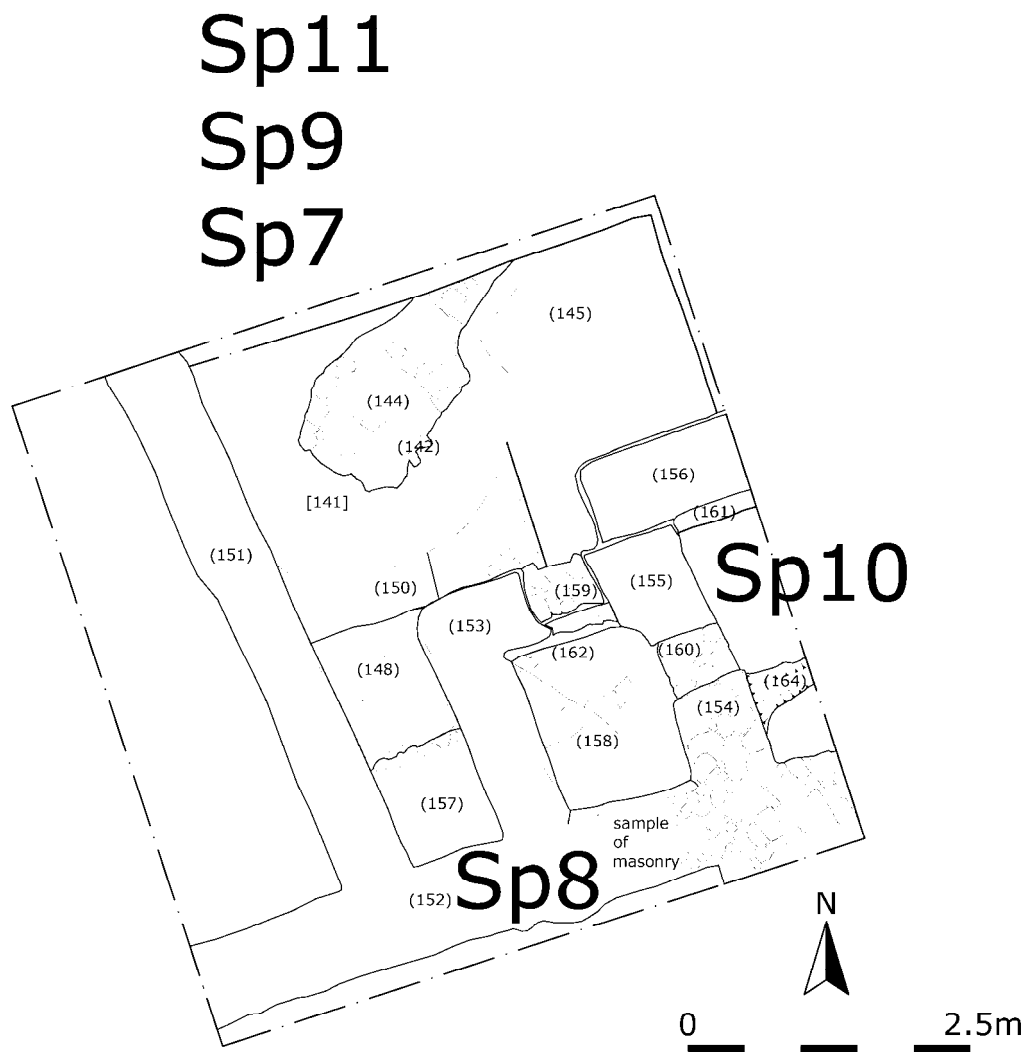
Space 12 to the north west was primarily defined by wall <101>. This wall terminated with a large flat slab of cement that had been laid against its western end (Figure 7.13). This may have been part of a lined entrance way formed with wall <109> to the west. Two ashy deposits, (97) and (98), were uncovered in this room but neither could be directly linked to its occupation. To the north east Space 13 was formed by walls <101> and <103>. An area of cement surface (104) set into <103> may indicate that this space was internal. Feature <100> was built from the same stone as the walls and abutted wall <101>. It measured 1.8m from north to south and 1.12m from east to west. This feature may have been a buttress associated with 101 although ash deposit (99) located within the rubble may indicate that it was the remains of a chimney or feature associated with a hearth.

Space 15 to the south east was formed primarily by walls <106>, <103> and <110>. No features within this space gave any indication as to whether it had an internal or external function.

#### **7.4.6 Trench MUEP03**

Trenches MUEP03 and MUEP04 were targeted in order to provide information regarding depth and date of any surviving deposits in these areas inside the fort. MUEP03 was located on a high point within the fort complex 6m to the north east of MUEP02. It included the ENE continuation of wall <10> (wall <152>). The trench measured 6m x 6m and was aligned on wall <10>=<152>, WSW to ENE, and was excavated to a depth of 1.18m. Prior to excavation very little remained on the surface, although the remnants of a stone and mortar were visible on the surface. After the removal of overburden (70) two layers of rubble collapse/demolition were encountered (48, 71). These deposits included modern refuse as well as earlier 20th century pottery and were interspersed with natural silty accumulation deposits. Several more walls were revealed below the overburden (Figure 7.14). Space 8 was formed by walls <153>, <155>, <160>, <154> and <152> and appeared to be a small room measuring 1.48m by 1.28m. Space 9 consisted of the northern portion of the trench bounded by walls <151> and <153>. Space 10 was located to the east of walls <155>, <154>, <160> and was later bounded to the north by wall <156>.

Rubble in Space 8 was up to 0.56m deep and overlay a dark brown fine loose silt (119). Grey green and black lenses within this locus may indicate that this space was used for the deposition of mixed refuse including organic material and possibly cess in its later phases (Figure 7.15). Locus (119) physically overlay a cement surface (158) which covered the entire base of the room formed by Space 8 and continued as a wall lining up the north, south and east facing inner walls. However, it was noted that (158) ran underneath wall <160> to the east and plastering (162) to the north. Wall <160> consisted of uncoursed stone 200mm-500mm wide that had been used to block a gap between



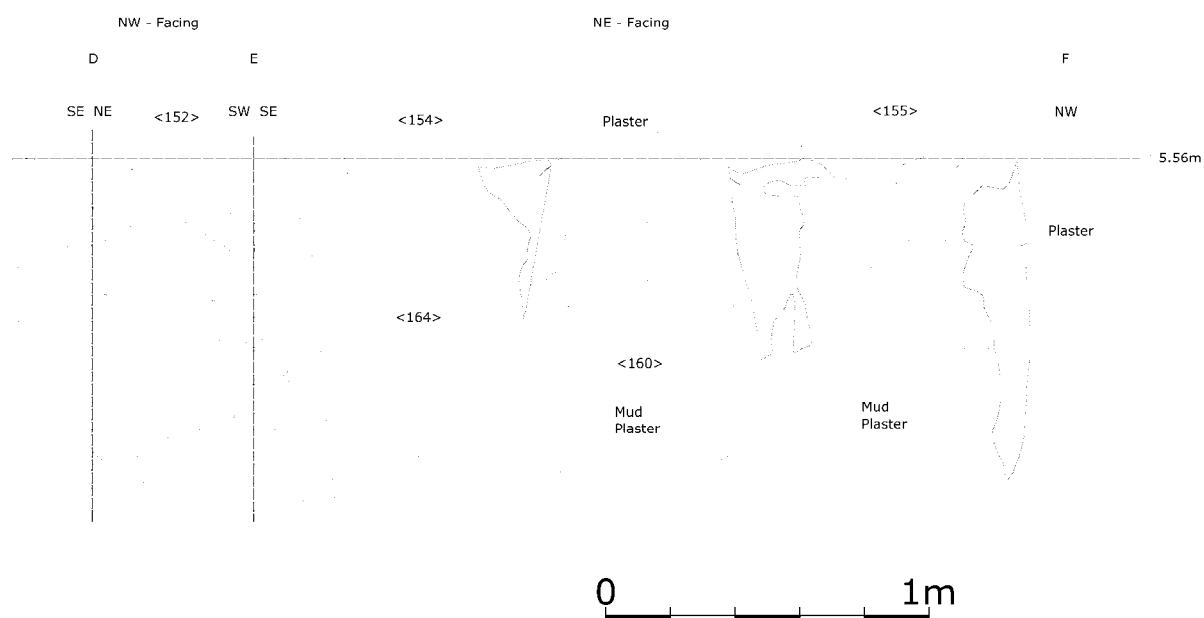
**Figure 7.14:** MUEP03 post-excavation plan

walls <155> and <154> before being covered with mud plaster (Figure 7.16). Presumably this gap had been the doorway into Space 7 to 8 (Figure 7.17). Another entrance into this space had been knocked through from the north between walls <153> and <155>. Cement plaster (162) had been applied to the sides of this entrance indicating that the re-plastering of Sp.8 was associated with a phase of remodelling of this whole part of the building. The deposition of (119) was the last in a series of events and remodelling in Space 8 which had involved the moving of the doorway from the east wall to the north wall.

The activity in Space 9 was closely related to that in Space 8. Below the rubble in Space 9 was an upper occupation represented by compacted silty-sand surfaces (118) and (124) (Figure 7.18). These surfaces abutted the surviving walls were clearly a reuse of this space after its primary function had become redundant. Surface (124) also abutted infill/blocking (159) that had filled the gap previously knocked through into Space 8. Two small pits were cut into these surfaces. Pit [88] had been dug first; it had a diameter of 0.54m and a depth of 0.1m. Pit [85] was dug through the fills of [88]. It was



**Figure 7.15:** MUEP03 Layer 119 in Space8



**Figure 7.16:** Section 32. Blocking and plastering (160) in Space.8





**Figure 7.17:** Doorway Blocking (160) between Space 8 and Space 7\10. MUEP03



**Figure 7.18:** Late surface 118 in MUEP03 Space 9





**Figure 7.19:** Lined and covered pit [141] in Space 9, MUEP03



**Figure 7.20:** Surface (145) abutting wall 156 and plastering (162), MUEP03

sub-rectangular 0.36m wide with a depth measuring 0.12m. These pits both contained dark grey ashy fine silts. There was no evidence of in-situ burning in these pits or on the surrounding surface and so these deposits may represent one-off low burning events or the results of burning elsewhere and later deposition in this space.

The removal of surface (124) revealed loci (142) to the west and (125) to the east. Layer (125) was a compacted silty sand infill layer which included occupation debris. This may have represented the final use of the initial phase of activity within this room. Layer (142) was a course sandy silt infill of a pit that had truncated (125). Pit [141] was dug from the level of the abandonment layers (including 125) of Space 9 (Figure 7.19). The pit was dug in order to build a stone lined sump or cess pit the depth of this feature could not be ascertained beyond 2m because it remained unexcavated. This pit and associated drain were capped with a mixture of stone and mortar (144) that set hard and preserved a void underneath. This was then covered by deposit (142). The drain ran into the pit from the north and presumably was associated with a later phase of building than that represented by the walls in this trench.

In the eastern half of this space surface (145) represented occupation after a significant phase of re-modelling. This surface abutted plaster lining <162> which was associated with the knocking through of wall <153>\<155> from Space 9 to 8. At the same time as this knocking through event a new wall, 156, was built abutting wall <155> to the east of the space. Wall <156> continued eastwards beyond the edge of the trench. This new wall was lined with cement plaster <162> at the same time as older walls 153 and 155 indicating that it was designed to change the use of space within and that it was contemporary with these other walls (Figure 7.20). Prior to this re-plastering but after the construction of wall 156 a thick make-up layer for floor (145) was laid (146).

Activities in the larger space stratigraphically below wall <156> and make-up (146) have been assigned to Space 7. Description of this space represents the visible construction in this trench of walls and surfaces although given that excavation ceased at this stage there are no-doubt further phases below. Space 7 was formed by wall <152>=<1>0 to the south and wall <151> to the west. Walls <153>\<155> and <154> divided this space from Space 8. All of these walls were bonded together and lined with both mud and cement plaster and were part of a single construction phase (Figures 7.21 & 7.22). This phase also included the construction of a stair case, 148, between walls 151 and 153. Four of these steps remained with risers of 220mm and treads of 320mm (Figure 7.23). There was indication from the plastering at the top step that at least one more had been present. Hardcore (157) had been used to fill and level under the staircase. These stairs led down on to cement surface (150).

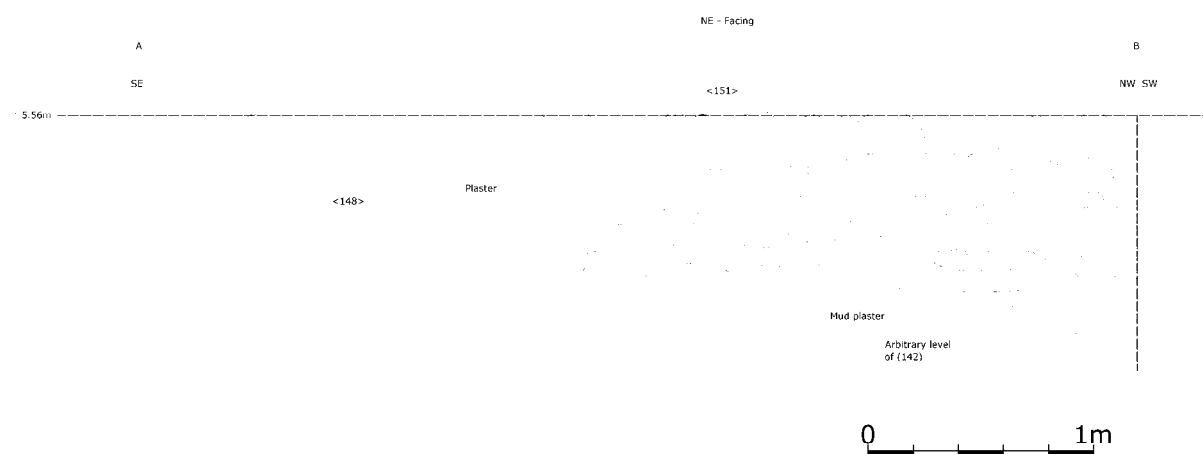
It was unclear from the excavations whether these stairs were leading up from a ground floor to the first or down from a ground floor to a basement. Given the later addition of sump pit [141] it seems most likely that Space 7 represents a basement. This is supported by the level at which floor surfaces were encountered in MUEP04 and MUEP08. This interpretation and the fact that it appears to have gone out of use well before the main phase of levelling over the site as a whole may explain the state of preservation seen in this building.

The construction of wall <156> formed a small area, Space 10 to the south east of the trench. This was bounded by wall <156> to the north, walls <155> and <154> to the west and wall <152>=<10> to the south. Rubble in this room overlay a drain feature similar to that seen in Space 9. It had been





**Figure 7.21:** MUEP03 post excavation. Facing south



**Figure 7.22:** Construction and plastering of wall 151



**Figure 7.23:** Stairs 148 in MUEP03 Space 7

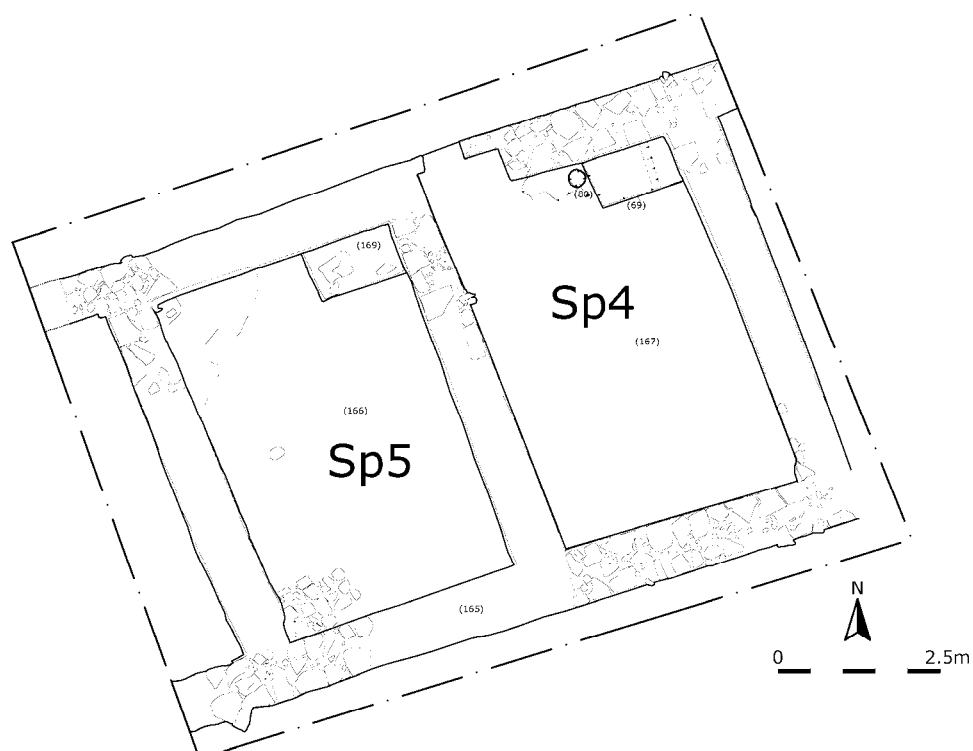
cut through surface (161) which was associated with the original activity in Space 7. This feature was then covered with a cement mortar capping (164) and backfilled with rubble (143).

MUEP03 did not establish the total depth of archaeology in this area but it did prove that a great deal survives below the surface. Particularly important is the fact that there appears to have been several phases of use prior to the final modern demolition.

#### **7.4.7 Trench MUEP04 and MUEP07**

Excavations in MUEP04 targeted a short length of wall identified 25m to the west south west of the western outer wall. The trench was aligned on this wall and measured 11.3m x 8.5m. It was excavated to a maximum depth of 0.5m. After the removal of overburden (2 and 3) a highly compacted demolition rubble was uncovered (4 and 5) (Figure 7.24). A small pit, [13] was uncovered below this rubble which may have been used as a temporary fire pit at some point after the initial abandonment of this building. Its fill (14) contained moderate amounts of charcoal inclusions. After the removal of the rubble layers (4) and (5) two spaces were identified. Space 4 to the east and Space 5 to the west. Wall <165> defined both of these spaces. This wall varied in thickness between 0.7m and 0.84m and was constructed from a mixture of limestone and flint. The walls were lined with a cement-like lime-based plaster which survived best on the internal faces of the walls. Both Spaces measured 3.8m in width and 5.6m in length although the corners of walls <165> with the internal dividing walls were not at perfect right angles and so dimensions varied within the rooms.





**Figure 7.24:** Post-excavation plan of MUEP04



**Figure 7.25:** Cement lined basin in MUEP04. Facing south



Figure 7.26: MUEP04 post-excavation: Space 4 (left) and Space 5) right



Figure 7.27: Post-excavation plan of MUEP07





**Figure 7.28:** MUEP07 Foreground: demolished stone floor (35) with undisturbed surfaces of Sp.6 behind. Background: MUEP04



**Figure 7.29:** Western wall of well in fort complex

The removal of lower rubble layer (19) in Sp.4 revealed cement surface <167>. This surface was bonded to the wall lining. The surface was highly degraded and in places where it had broken up it was clear to see that (167) was the last of multiple resurfacing events. A cement lined basin had been built into the north eastern corner of the room (Figure 7.25). This measured 1.26m by 0.62m. This basin was filled with rubble collapse\demolition (65, 66, 67, 68) which contained moderate amounts of plaster fragments as well as inclusions of pottery and bone. The lowest fill (68) was sampled for charred remains in case any evidence of function remained prior to the accumulation of the rubble. The basin had a step or seat built into it at the eastern edge. This was 0.14m below the level of the surface and was 0.42m wide. There was then a drop of 0.2m to the base of the basin. The cement surface (167) in Space 4 continued down to line the sides of the basin whilst a new lining (69) covered this inside the basin. This indicates that there was at least one resurfacing episode in this feature. At the lowest point in the basin a drain was uncovered. Some of the fill of this drain (72) was excavated and taken for micro analysis. The basin is the focal point of this room with surface (167) generally angled to drain into it.

Closely associated with this basin, two other features had been cut into the floor. Pit [80] lay just outside of the western end of the basin. It contained two natural infill deposits at the top which were removed to reveal deposits (77), (78) and (79). These deposits were burnt and ashy and may have related to the original function of the pit. Pit [80] had a diameter of 0.29m and a depth of 0.23m and was lined with a fired clay material 30mm thick. It is most likely that this pit was used for coals or another hot material but there was no evidence of a fire having actually been set with in it. Another small pit to the west of [83] may have been a similar feature, but it's lining survived less well. Pit [83] was 0.14m deep and had a diameter of 0.24m.

After the removal of rubble and windblown accumulation layer (20) from Sp.5 it was apparent that this room had an identical layout to that of Space 4 (Figure 7.26). Several resurfacing episodes (166) were identified and a basin with separate lining was located in the north eastern corner. A small deposit of burning 0.24m in diameter may have represent an ash pit. Features in this space were not excavated.

Trench MUEP07 was opened 7.5m to the west of MUEP04 in order to establish if this sequence of rooms continued. MUEP07 measured 8.3m by 4.8m with an extension of 5m to the east (Figure 7.28). In the main trench several layers of compacted rubble were encountered. A 2m by 2m sondage was excavated in the north western corner of the trench which encountered deposits thought to be the natural geology after 0.2m. The trench was then extended to the east towards MUEP04. Wall <42> was uncovered running parallel to the internal divisions of wall <165>. This would have formed a cell equal in dimensions to Space 5 and Space 4 between this wall and the western wall of Space 5. Surfaces seen continuing to the west of wall <42> indicated that a fourth room (Space 6) continued this suite to the west. Extensive evidence of demolition could be seen to the west where these surfaces (33, 34 and 35) became so degraded that only rubble remained. It was interesting to note the presence of a stone floor <35> under the multiple layers of cement resurfacing in Space 6. It seems likely that this was the original method of construction for the floor in these rooms (Figure 7.29).

Walls extended further to the west and two or three similar rooms may survive here. There was no evidence continuation to the north or south.



From the evidence recovered it is clear that the buildings within the fort were extensive and that in places they survive to a considerable depth and quality. To date pottery recovered from the site can only date the backfilling and abandonment of the site to the late 19<sup>th</sup> to 20<sup>th</sup> centuries but it is clear from the quality of preservation that sealed deposits that could shed light on the foundation and phases of occupation.

#### **7.4.8 Associated Features**

Several features within the fort and just outside of it may have been wells although none of these features currently hold any water. Within the fort a large square feature lay 17m to the south of MUEP02. This feature survived to a depth of 2.4m below the current ground surface in places and measured 10m by 10m at its widest points. This feature was aligned with the outer fort wall and the buildings within the fort. It may have been walled on all sides when constructed but now only the western wall survived along with a fragment of wall to the east. This wall was the most well preserved and tallest piece of standing masonry within the whole site of Qal'at Murayr (Figure 7.30).

It had been built up against a feature that survived as a mound formed by a series of enclosing walls. One of these walls may have continued down as the lining of the well. This walled mound formed a high point with the ground falling by one or more metres in all directions around it (Figure 7.31). Similar wall constructions exist in historic and modern farms throughout Qatar, where one side of the wall was built up with a wall, which provided the base for a water tank for storing and redistributing water from the well. There was a gap of c.15m between this feature and the outer wall to the south and west.

Another feature that may have been a backfilled well lay 30m to the ENE. This feature measured 10m in diameter and was represented only by a slight depression in the ground so it was not possible to discern its original function.

Two other cut features were located just outside of the western wall. The southern feature measured 12m by 6m and survived to a depth of 1.4m. Two lengths of wall survived within this feature suggesting that it may also have been a well. The feature to the north was sub-rounded and measured 18m by 12.5m. It was 2.2m deep with a short length of wall surviving to the west. This feature had been cut through the outer wall of the fort and had sloping sides that were not indicative of a well. It is more likely that this feature represent a pit cut for stone robbing from the wall.

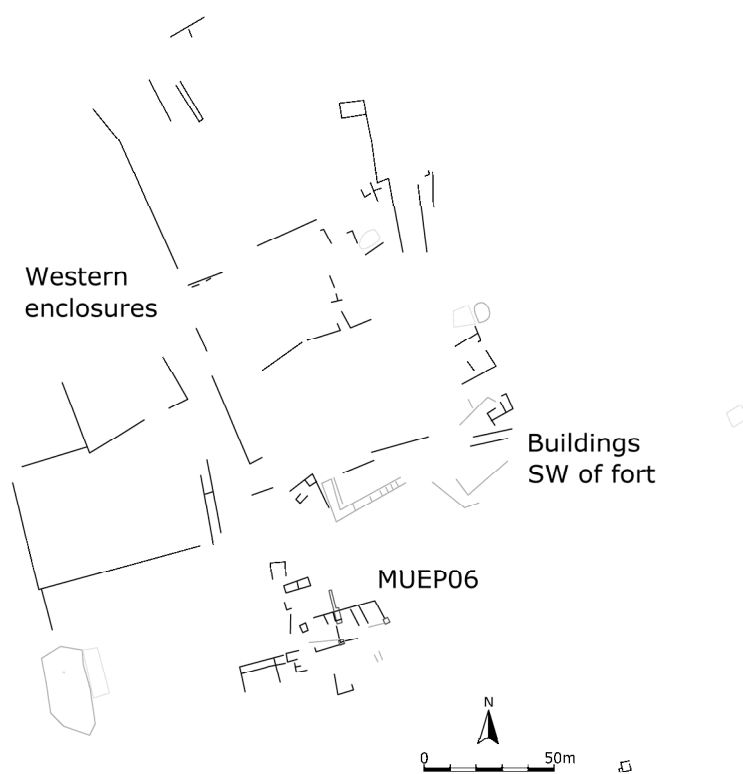
### **7.5 Features to the south and west of the fort complex**

#### **7.5.1 Western Enclosures**

A series of enclosures were identified to the west of the fort outside of the outer wall on the lower ground extending for 220m to the edge of the *sabkha* (Figure 7.32). Three to four enclosures were identified although none were complete. These enclosures varied in area from 0.2ha to 0.7ha. They were generally aligned with the fort and consisted of lime stone and beach stone boundary walls (Figure 7.33) clearly visible on the 1958 aerial photograph (see Section 2.4). These walls measured 0.7m to 0.9m in width, but in many cases the wall was masked by a mound of rubble up to 5m in

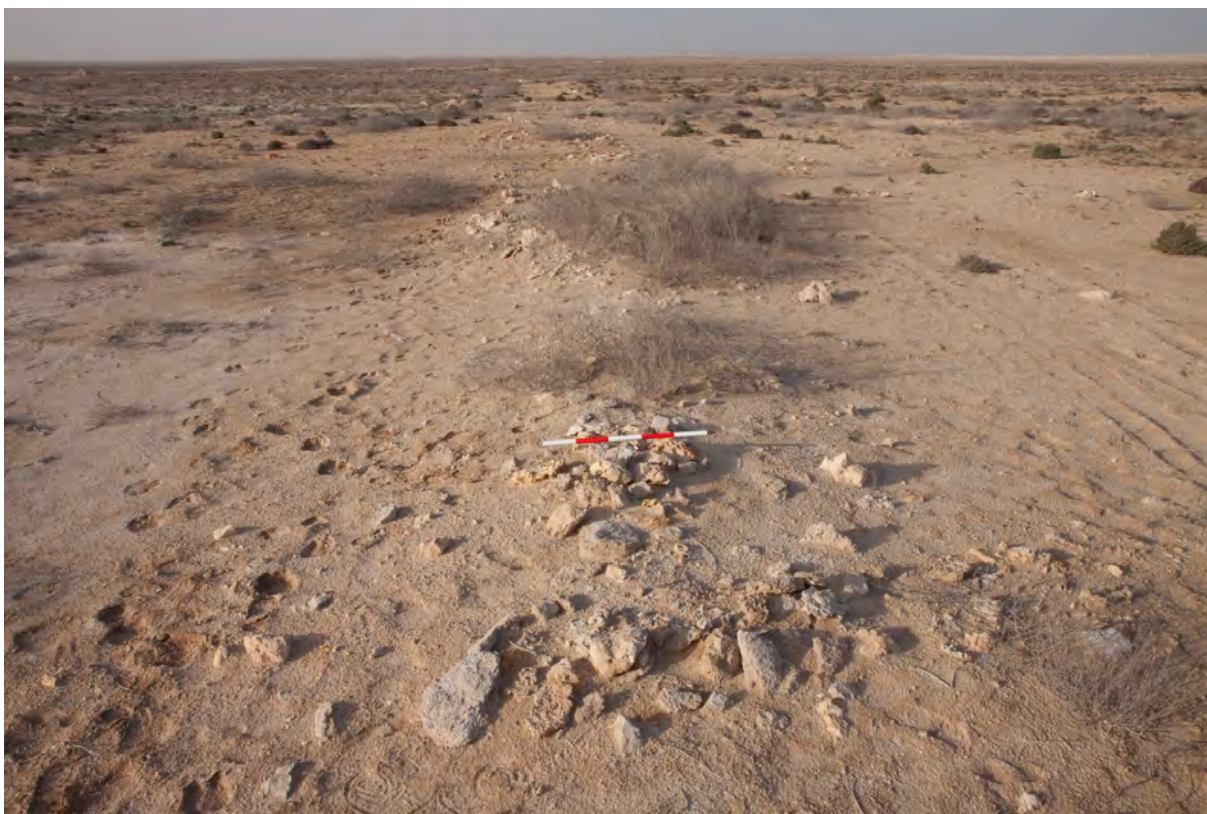


**Figure 7.30:** Walled mound possible defensive keep. Seen from outer wall looking NE



**Figure 7.31:** Plan of Western Enclosures and extra mural features





**Figure 7.32:** Remains of enclosure wall facing WSW



**Figure 7.33:** Masonry rubble in western enclosures





**Figure 7.34:** Two celled structure facing NE



**Figure 7.35:** Remains of rectangular building facing NNE



width. The most northerly enclosure appeared to have had an extensive series of entrances that closely related to the outer wall of the fort. These walls were associated with a possible backfilled well. The enclosures to the south contained the fragmentary remains of walls that may have been part of buildings in the interior.

To the north of these enclosures an area of walls and rubble appeared to be the remains of several buildings. These are located at the point at which the curtain wall that extended from the city intersected with the fort (Figure 7.33). A substantial piece of mortared masonry was associated with these buildings and may give an indication of the scale of construction here or in the outer wall of the fort (Figure 7.34).

### **7.5.2 Buildings**

A series of wall foundations were located surviving at ground level or up to 0.3m above it to the south east of the fort complex. These may represent up to six separate structures although the exact number was not possible to ascertain from the surface alone. The most northerly structures lay just 30m away from the outer wall of the fort. These consisted of five lengths of wall between 0.9m and 1.2m wide indicating quite a substantial structure. Evidence of these structures continuing WSW could be seen by piles of rubble up to 3m wide that followed the lines of the walls.

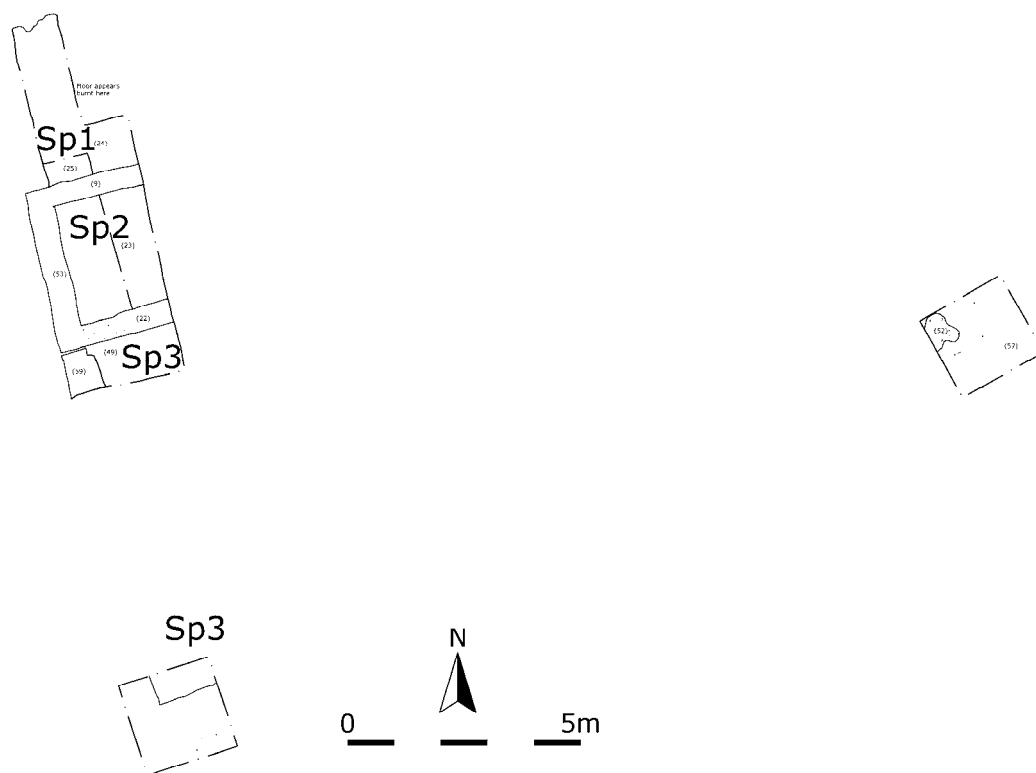
The remnants of a walled enclosure were associated with these building. An 'L' shaped wall, 0.7m wide, with a small internal cell was located to the south west of this enclosure, which may represent an area of garden beds.

A more substantial series of walled remains were located 40m further south. These buildings appeared to be located on a small rise that may have given protection from the sporadic flooding that occurs in this area during heavy rains. The remains of three buildings in particular were relatively well preserved. The most westerly of these was a structure consisting of two cells surrounded by wall rubble up to 2m in width (Figure 7.35). The walls were not particularly well defined but appeared to consist of small limestone rocks up to 400mm in length, with no discernable bonding or coursing. Both cells were c.1.75m wide and that to the east measured 4.5m in length whilst the length of that to the west was 2.5m.

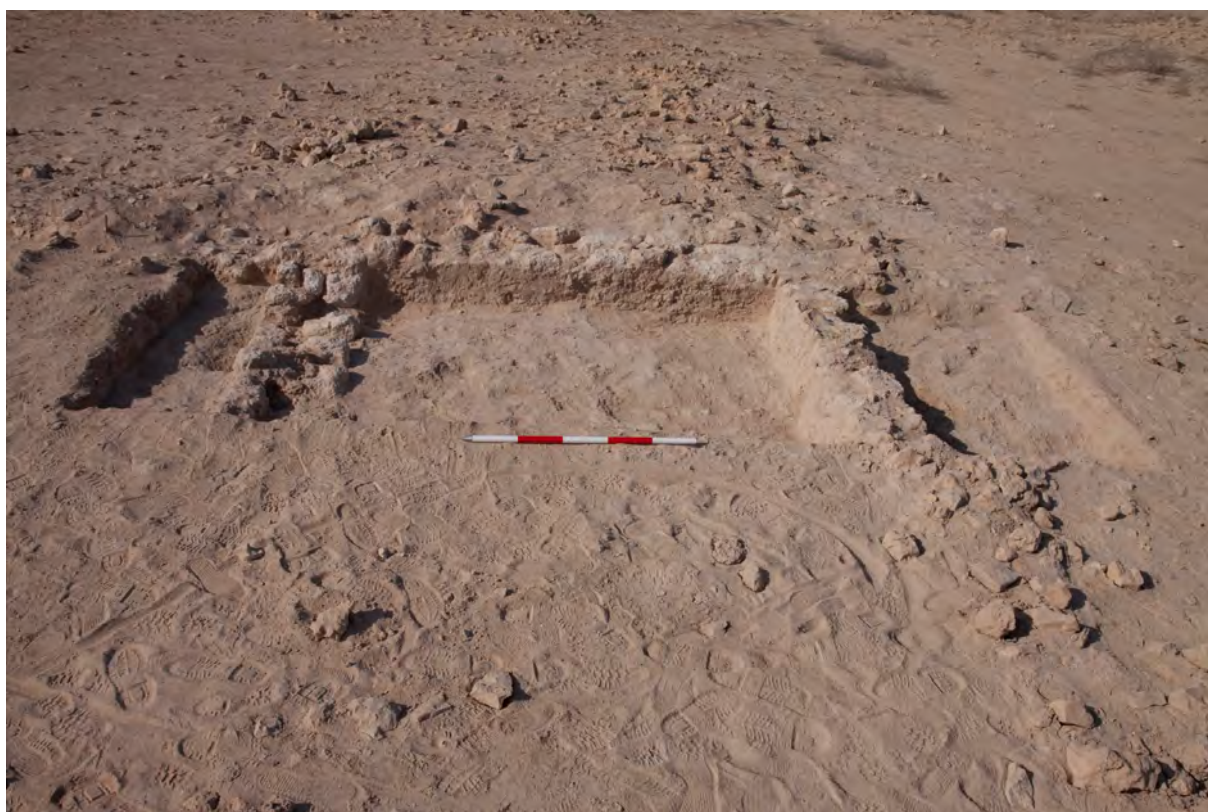
This larger complex of buildings consisted of the remains of six walls that formed the layout of a roughly rectangular building that was orientated ENE\WSW (Figure 7.36). The walls were found to continue to the south west of this structure but apart from a single cellular room that was well preserved the other walls did not survive above the ground surface. A trench was excavated within the remains of the rectangular building in order to characterise the quality of preservation, depth and date of the building.

### **7.5.3 Trench MUEP06**

The original trench measured 5.2m in length and was 2m wide. It was targeted over an intersection where what appeared to be an external wall was joined by a perpendicular 'internal' wall. The trench was later extended 0.4m SSE and 3m NNW and was excavated to a maximum depth of 0.56m.



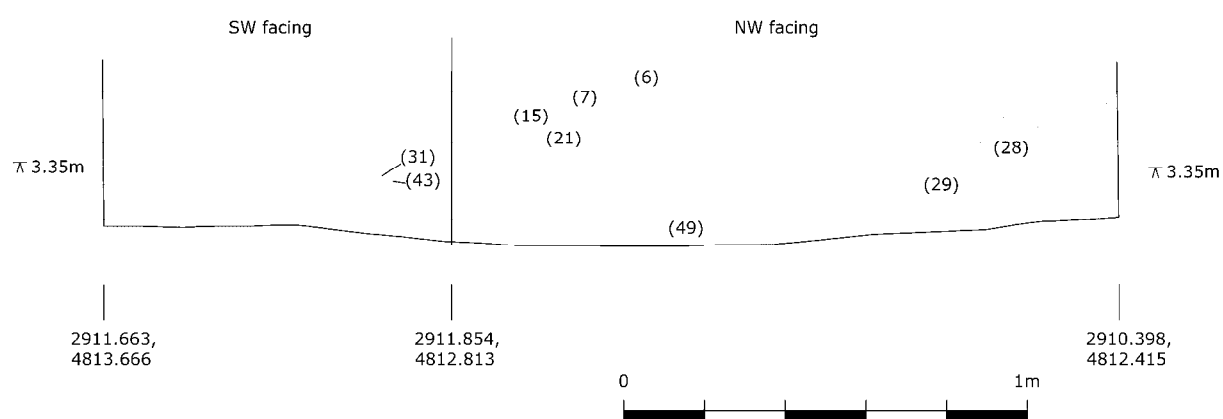
**Figure 7.36:** Post-excavation plan of MUEP06



**Figure 7.37:** MUEP06 Surfaces (21), (23), (24)



**Figure 7.38:** Relationship of wall 9 with wall 53 facing west



**Figure 7.39:** Section 8 with surfaces highlighted, MUEP06



**Figure 7.40:** Vessel 46 in pit [44] in surface (43) facing SW

Removal of overburden (6) revealed the top of wall <9> and wind blown accumulation layers (7) and (8). These sealed rubble/collapse layers (15) and (16). These layers, in turn, sealed a compacted sandy wind blown accumulation that may have included some of the primary wall collapse (17 and 18). At this stage it was noted that three spaces were defined by the relationship of the external wall <9> and an inner parallel wall <22>, with perpendicular wall <53> (Figure 7.38). Space 1 consisted of the deposits to the north of wall <9>; Space 2, those deposits between walls <9> and <22>; and Space 3 those deposits to the south of wall <22>.

After the removal of locus (24) in Space 1 the compacted mud surface (24) was uncovered. This consisted of a compacted clayey sand with occasional stone and mortar inclusions. The trench was extended in order to find the extent of this surface. It continued for 3.4m before a degraded edge was found. There was no other structural evidence associated with this surface and so it is likely to have been external to the main rectangular structure. This surface was overlying natural deposits and abutted wall <9>.

Space 2 was thus defined as a probable internal area. Removal of locus (17) uncovered a surface (23) of similar consistency to that of (24) (Figure 7.38). This surface was 0.08m thick and also physically overlay natural geological deposits. It abutted walls 9, 22 and 53. Walls 9, 53 and 22 were all lined with a coarse mud render (58) within Sp.2. They appeared to be contemporary and were bonded to each other (Figure 7.39).

The trench was extended 0.4m to investigate Space 3 to the SSE of wall <22>. Here, the removal of locus (15) revealed surface (21). This had a similar consistency to that of (23) and (24) and abutted



wall 53. Given the similarity of these surfaces it is possible that they were contemporary although no direct evidence of this was found. An exploratory slot opened 6m to the SSE of MUEP06 uncovered a similar surface (57) which may also be related to this phase of activity. Surface (21) was underlain by thin silty-sand surface (28). Both of these surfaces contained pottery dating to the 19<sup>th</sup> and 20<sup>th</sup> centuries. Removal of surface (28) uncovered another thin mortar based surface (31) which in turn overlay surface (43) (Figure 7.40). Surface (31) was cut by a large pit [30]. This pit was 0.14m deep and contained a large quantity of ash and charcoal and may have been used for the deposition of domestic refuse.

Surface (43) was cut through by a small pit into which an upturned vessel had been placed (Figure 7.40). The vessel (46) was a half complete wheel-made jar in a hard-fired, thin-walled, buff coarse ware. It contained a very fine ashy deposit (45) that included shell and bone. This vessel may represent the remnants of a temporary oven built into to surface (43) although no evidence of in situ burning was found. Surface (43) physically overlay natural geological deposits and abutted wall <22>.

Evidence for more intensive occupation was uncovered in Space 3 than in Space 2. Given that the walls surrounding Space 2 were bonded together and only one surface layer was laid it may be the case that activity in this room represents a separate, perhaps more short lived, occupation event.

#### **7.5.4 Outlying Building**

One hundred and fifteen metres to the east of MUEP06 a small square building was located (Figure 7.41). It measured 3m by 3m internally and was orientated ENE\WSW. An entrance 1.2m wide was located to the north east. An annex of 1.2m<sup>2</sup> was located at the opposite corner to the south west. Very little evidence of the function of this building remained and it may have been a temporary shelter or stock enclosure. It was notable that this structure was avoided by the later remodelling of the landscape and perhaps was standing and in use at this time.

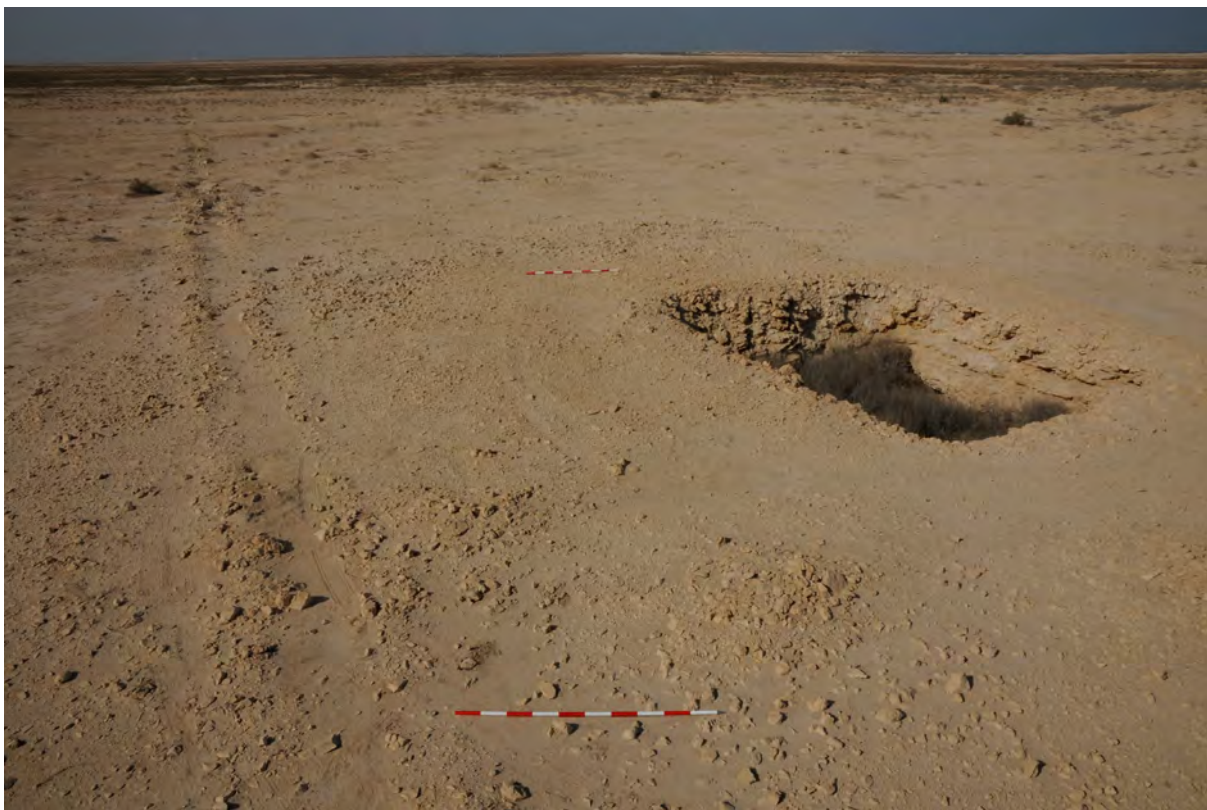
#### **7.5.5 Wells**

Three wells were located outside of the wall of the fort in this area. A backfilled well and associated upcast were identified adjacent to the buildings immediately to the south west of the fort wall. This may have measured c.7m<sup>2</sup> when first constructed with its upcast being placed to the east. It survived to a depth of 0.30m where the backfill had slumped. A well that may have been associated with occupation of the rectangular building (MUEP06) was identified 52m to the west of this structure. This had been backfilled and survived as a rectangular depression in the ground orientated north\south. It measured 18m by 6m.

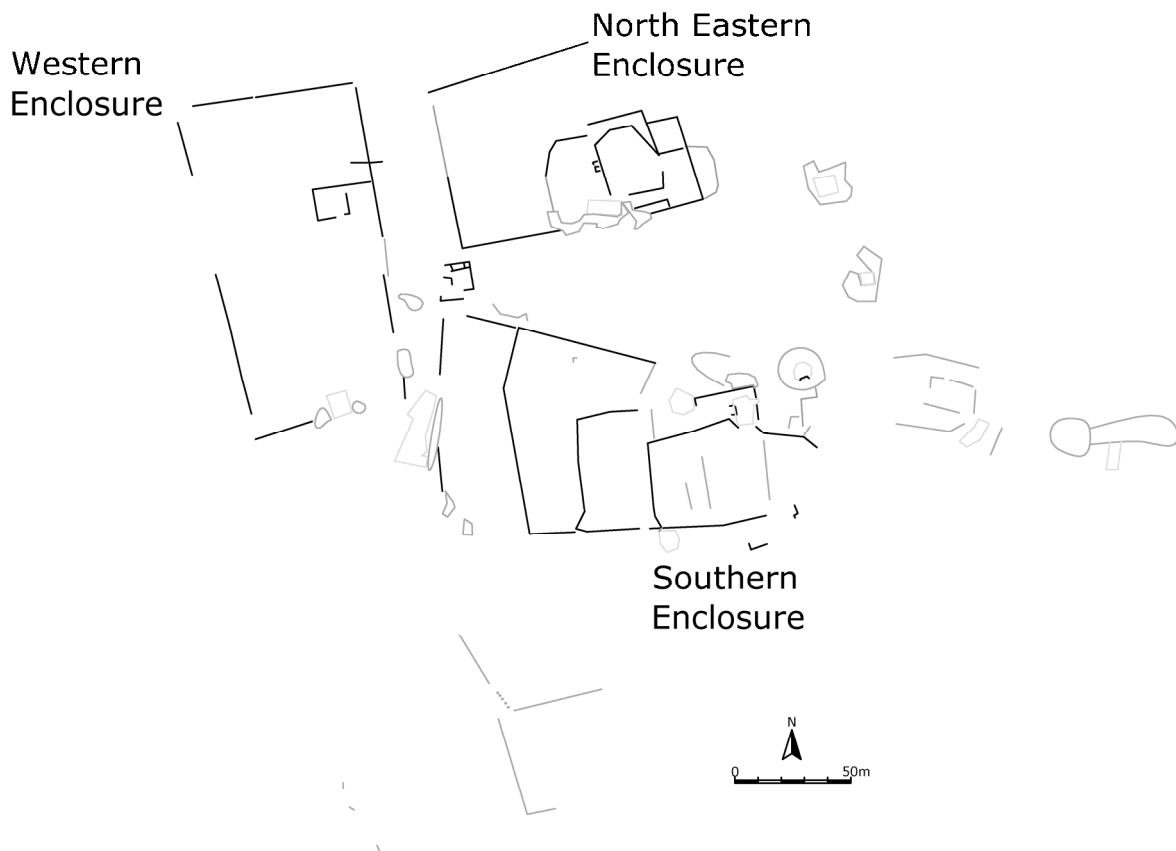
Another well was located 84m to the east of these buildings (Figure 7.42). It measured 5.5m by 6.5m and was sub square in shape. It had steep vertical sides and had clearly not been backfilled. It was cut deep into the bed rock and survived to a depth of over 3m.



**Figure 7.41:** Small outlying structure facing north



**Figure 7.42:** Well south of Fort wall. Facing south west



**Figure 7.43:** Plan of Southern Enclosures

## 7.6 Southern Area

Three large enclosures were located 250m to the south of the fort (Figure 7.43). They survived in various states of preservation. Evidence for limestone and beach stone walls was found at all of the enclosures.

### 7.6.1 Western, north eastern and southern enclosures

The enclosure located to the west survived least well. This enclosure was formed by 8 surviving segments of wall (0.7m-0.9m wide) that bounded an area of ~1ha. A small walled structure attached to the eastern enclosure wall may have been some kind of building associated with the function of this enclosure. The southern segment of this enclosure wall was truncated by a pit measuring 10m by 10m which may have been used to remove stone from the wall for re-use elsewhere.

The north eastern enclosure was surrounded by three segments of surviving wall. The northern segment of the western wall was evidenced by a rubble mound 4m wide that followed its course. These walls measured up to 1.1m in width and surrounded an area of 0.6ha (Figure 7.44). The western end





**Figure 7.45:** Walls of north eastern enclosure. Facing NNE



**Figure 7.46:** Western wall of southern enclosure. Facing north





**Figure 7.47:** Southern enclosure showing remains of internal dividing wall



**Figure 7.48:** Well to the north of southern enclosure and knocking through of wall. Facing SE.

of this enclosure appeared to have been truncated by the construction of a trackway whilst a large pit and associated upcast had caused considerable disturbance to the southern wall. This may represent later quarrying for reuse. A series of walls had been constructed within this enclosure that may have been the remains of buildings as well as stock holding areas. The western most internal wall was evidenced by rubble 5m wide indicating that a substantial wall may have laid underneath.

The southern most enclosure was the largest with an area of 1.17ha. Most of the walls of this enclosure survived only as rubble spreads, but where their width could be identified they measured between 0.7m and 1m wide and survived in places to heights of over 0.6m (Figure 7.45 & 7.46). The enclosure consisted of four areas defined by internal walls. The western most area may have been part of an earlier enclosure and the remains of this wall had been cut through by another wall to the east. It had also been cut by a pit, possibly a quarry, with the upcast dumped over the wall. The remainder of the enclosure consisted of three sub-rectangular areas with internal dividing walls (Figure 7.47). These walls survived as rubble mounds up to 2.5m wide and 22m in length. The north eastern wall of the enclosure appeared to have been knocked through and remodelled in order to provide access to a well (see below). This well was associated with a 1 m wide enclosure wall that had been added to the north of the main enclosure. The eastern side of this enclosure did not survive well except for a 2 m wide, curvilinear rubble bank 2m in width running from the well around to the south east.

The partial remains of several stone walls were identified further to the east on the eastern side of the modern track. Four segments of these walls possibly represented the remains of a sub-rectangular building. These walls did not survive well on the surface but appeared to have been covered by a layer of colluvium derived from the substantial slope to the north of them. Therefore it is likely that sub-surface preservation is good.

The partial remains of two other enclosures were located 53m to the south of the southern enclosure. These survived only as three segments of walls represented by only one or two stones on the surface.

The function of the enclosures was not clear from the survey. Their location on what appears to have been a geological seam where water was relatively abundant (see below) and the presence of substantial walls and buildings may indicate that this area was used for domestic occupation with livestock and small scale horticulture.

### **7.6.2 Buildings**

Located in the space between these enclosures a series of wall lines suggested the presence of a stone built unenclosed building. These remains survived virtually flush with the ground surface and consisted of six segments of wall up to 0.75m wide. The surviving walls covered an area 17m by 15m but since no complete course of a single wall was identified it is not possible to estimate the total extent of this building complex.

### **7.6.3 Wells**

To the east of the enclosure complex seven wells were identified. Five of these had survived well with some moderate backfilling whilst the two furthest to the east had been completely backfilled and levelled. None hold water at the current time. Three wells were closely associated with the southern

large enclosure. The most westerly of these wells was sub-rounded with steep sides and survived to a maximum depth of 4m. This may have been the original well used by the occupants within the southern enclosure. It appears to have been partially backfilled at some point. A second well 15m to the east was sub-rectangular measuring 11m from north to south and 6.3m from east to west. This survived to a maximum depth of 1.5m. This well was associated with a knocking through of the northern wall of the southern enclosure apparently to create access to it (Figure 7.48). The southern edge of the well was ramped and this may have been a later addition to allow access for animals. A wall had been built around the outside (north and east) of the well that may have been used to contain animals. A walled platform had been built on the eastern edge of this well that may have been associated with its original use.

Three wells were located to the north east of the enclosures. These all had vertical rock cut sides and substantial upcast deposits surviving all around them (Figure 7.49). The upcast consisted almost entirely of small natural rock fragments even though large blocks could be seen in the sides. These larger rocks were presumably used for building material elsewhere. The wells were square or sub-square measuring from 5m to 10m in width and were in excess of 3m deep. The most southerly of the three wells had a stone walled platform built into its southern edge, which may have once been the base of a tank (see section 7.3.1 above).

Further to the east two sub-rectangular areas of disturbed ground closely associated with a large upcast deposit may indicate the location of backfilled wells. This is supported by aerial photographic evidence.

The number of wells in this area suggests that this location, at the bottom of a substantial slope on the edge of the sabkha, was a place where water was close to the surface. It may represent a more permeable vein of geology that was being repeatedly exploited by the inhabitants.

## **7.7 The Cemetery**

Located 116m to the south of the enclosures, on a small rise just before the land sloped in to the sabkha, an un-walled cemetery was identified. This rise was only 0.6m over a distance of 18m but the difference in vegetation and geology between the two areas made a visual impact in this landscape.

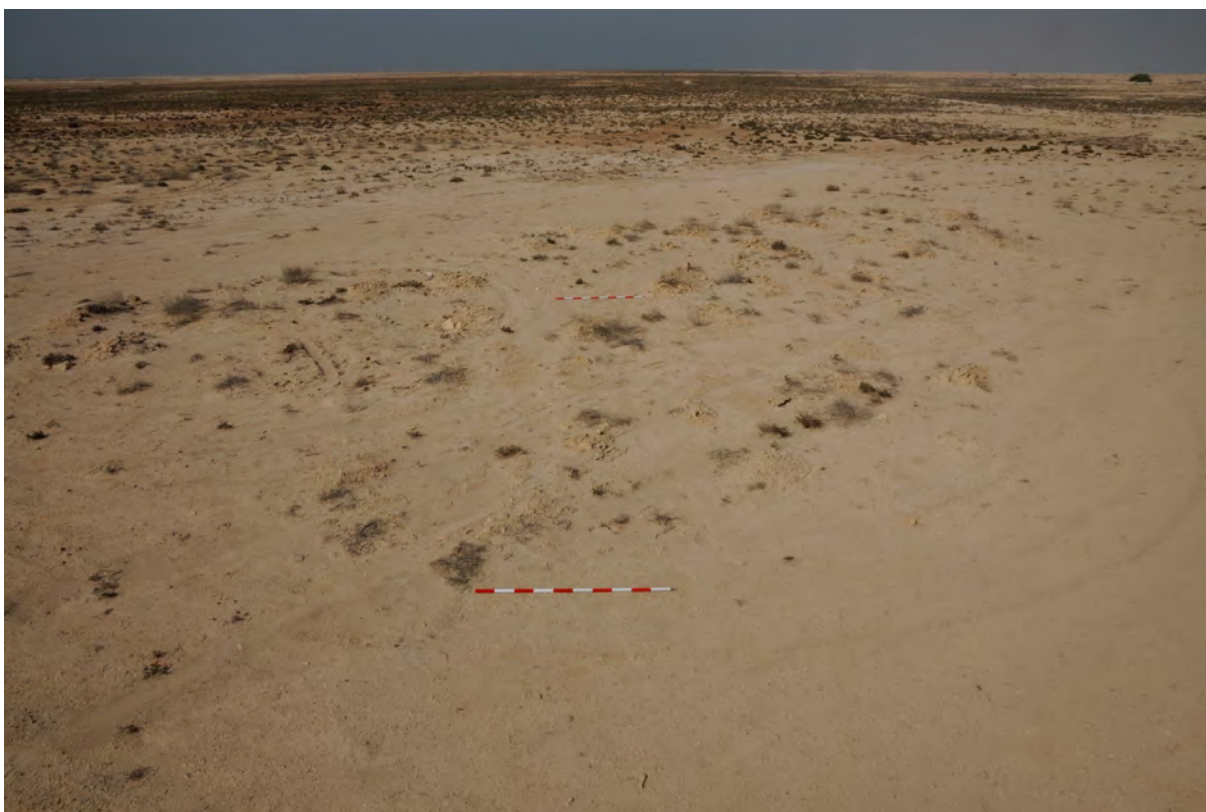
The cemetery consisted of ~50 graves represented by stone mounds measuring between 4m and 1m in length and up to 1.9m wide (Figure 7.50). These mounds were aligned from NW-SE with headstones surviving on 5 graves at their north western end. Erosion on many of the graves had revealed the top of the stone lined burial chambers. Two of the graves had suffered significant amounts of damage due to animal burrowing whilst all appeared to have been eroded by modern wheeled vehicles, the tracks of which were still evident.

## **7.8 Landscape Remodelling**





**Figure 7.49:** Well with surrounding upcast deposit. Facing SE



**Figure 7.50:** Setting and state of preservation of the cemetery. Facing NW



All of the areas of the site were effected in some way by what appear to have been several different types of disturbance. These were mainly evidenced by linear machine tracks and the tooth marks of machine buckets.

### **7.8.1 Mechanical disturbance**

A total of 9ha of inter-cutting linear tracks were surveyed. Although variable they averaged c. c.70m in length. They were formed by two parallel stone banks up to 0.3m high which maintained a uniform width of 3.2m throughout the area (Figure 7.51). Several of these tracks were isolated from the others and gave the impression of planned agricultural beds with regularly spaced plots like those identified around the buildings located to the south west of the outer fort wall. The tracks appeared to have avoided the majority of the buildings with only one such track coming close to the surviving building remains outside of the fort.

Another area of disturbance was located within the fort evidence of which was particularly clear just within the southern outer wall. This disturbance took the form of overlapping linear marks that continued from c.60m within the fort to the outside of the main southern wall where building material and rubble had been pushed. There was also some evidence of disturbance to the north of the fort where linear tracks were seen to continue under the modern fence. Apart from these two areas, no evidence was found by the current survey of deliberate demolition of the fort; however evidence of heavy machinery compacting and degrading the surviving archaeology was seen in MUEP07 (see above).

Four areas of land, all to the east of the study area, showed evidence of JCB\360 machine levelling with a toothed bucket. These lines were particularly clear to the south east of the area where the remains of several buildings could be made out amongst the levelled rubble. This disturbance to the north east overlay the bull-dozer machine tracks.

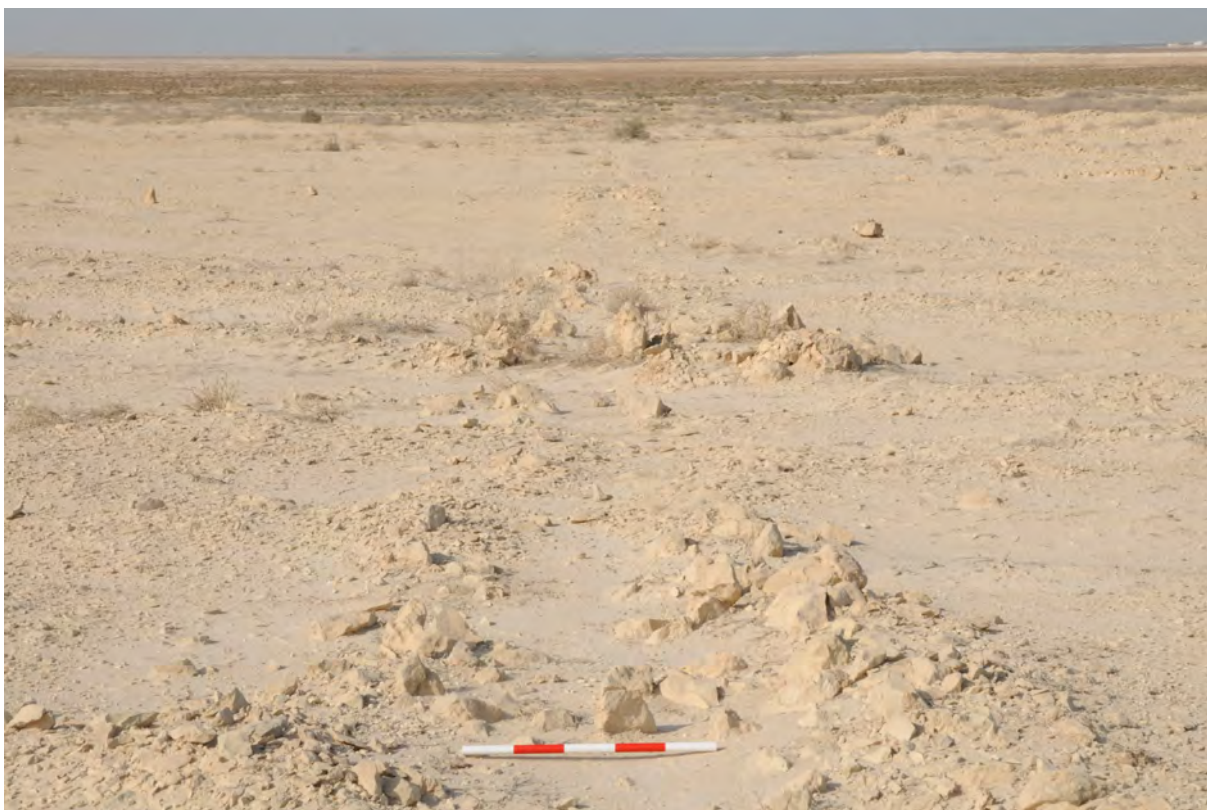
### **7.8.2 Quarrying**

The land to the far south of the study area around the southern enclosures contained evidence that the area may have been used for small scale quarrying for building stone. This was seen in particular in the pits dug through the walls and the enclosures where large blocks of natural stone had been used to build substantial walls. This use of naturally occurring local building stone was also seen in the upcast of the wells. On this lower lying ground on the interface with the *sabkha* slabs of natural stone were seen on or just below the surface and this resource appears to have been exploited on a small scale. In all 10 pits were identified including the two already discussed that cut through the enclosures. These pits were irregular in shape but showed evidence of being made by a JCB or similar machine. None survived to a depth of greater than c.0.5m. This may be due to the depth of the natural stone appropriate to building or because they have been largely back filled. All of these cuts were associated with spoil heaps.

## **7.9 Other Features**



**Figure 7.51:** Tracks caused by mechanical disturbance facing south from south east corner of fort wall.



**Figure 7.52:** Linear feature. Facing west

### 7.9.1 Linear Features

Three linear features were identified cutting across the entire width of the survey area and truncating all other features including the machine disturbance (Figure 7.52). They were truncated by the modern dull-dozed north-south track. These features measured 0.6m in width and appeared to have been dug with a machine. All emanated from the higher ground to the east with two of the features diverging from a single linear feature just before the modern track. The eastern ends of these features run up to a modern concrete hard standing and a track that leads to the modern road. To the west the linear features come to an end at the remains of three buildings. The northerly feature ended just before the point where it would have intersected with the rubble from the outer wall of the fort. The middle feature could only be traced as far as the buildings to the south west of the outer fort wall whilst the southern linear feature could only be traced to the track south of MUEP06. The construction of this southern linear feature truncated the remains of the rectangular building (MUEP06). The function of these features is uncertain although their form would suggest that they were designed to carry services of some sort to temporary encampments that are no longer present in the landscape.

### 7.9.2 Pottery Spreads

In total five pottery scatters were located in the study area. This pottery covered an area of up to 35m across in the largest of the spreads. Four of these scatters were located just to the east of the modern track and north of the area of wells associated with the enclosures. They were also associated with a poorly preserved and fragmentary stone built wall foundation, which may mark the location of a substantial early building (Figure 7.53). The scatters may also mark the location of middens which are now eroded. Another spread of pottery covering an area of 11m by 11m was located 150m to the west of the modern track and 175m south of the fence.

### 7.9.3 Shell Deposits

Deposits of beach shell were located to the north, east and south east of the study area. These took two forms, one of small sub-circular deposits with a diameter of up to 12m and the other of large rectangular hard standings. All of these shell deposits overlay all other features including machine disturbance. The sub-circular deposits tended to be found along the edge of the modern road.

The rectangular deposits had been laid down in twos or threes with a larger enclosed hard standing (up to 1.2ha) associate with one or two small hard standings. Some of these appeared to have been connected by tracks. The tracks also constructed from this shell deposit were then seen to lead from these hard standings down to the camel track; the camel racing track itself also being made from this shell deposit.

The largest of the hard standings was surrounded by a small wall consisting of a single line of rocks that may have marked the bottom of a fence line (Figure 7.54). A well was located in the centre of the western arm of this enclosure. This well had been backfilled with modern tins and other modern refuse. A section of bedding mattress springs was seen to be built into the wall just before it terminated next to this well. The shell deposit was removed in four areas, three in the large enclosure





**Figure 7.53:** Remains of walls associated with pottery spread. Facing north



**Figure 7.54:** Large enclosure with shell deposit facing east.



(MUEP09, 10, 11) and one in the deposit immediately to the east (MUEP12). It was found to be up to 0.3m deep and contained modern rubbish picked up when the shell was taken from the beach.

#### **7.9.4 Walls**

Two rectilinear three sided walled structures were located to the east of the study area. Both measured c.4m<sup>2</sup> and consisted of highly degraded walls that faced towards the prevailing wind. These features may have functioned as windbreaks for stock herders at some point. Very little remains of them to inform about function.

### **7.10 Discussion**

A wide range of features were located and identified within the landscape of Qal'at Murayr by the fieldwork discussed in this report. The interpretation of features was aided by aerial photography as well as by the rescue excavations carried out as part of this project. It is clear from the small interventions excavated through several areas of the site that archaeology is preserved to a considerable depth in some places. It was also evident that in other areas later activity had completely truncated the surviving archaeology. Where pottery was recovered dates tended towards the late 19<sup>th</sup> and 20<sup>th</sup> centuries although some sherds dating to as early as the 18<sup>th</sup> century were also found. The fort itself was clearly the major feature within this landscape and was located on the natural rise above the palaeo-shoreline. There was some evidence from the south of the fort complex, and from MUEP04 and MUEP07, that the building remains here had been disturbed or in some cases demolished by later remodelling of the landscape. However archaeological deposits sealed below rubble in MUEP03 and MUEP02, and sealed below slope-wash and rubble in MUEP01 indicate that a considerable amount of collapse had occurred prior to this levelling. This may imply that the preservation of other parts of the fort complex can be expected to be as good as that uncovered in MUEP03.

The preservation of the enclosures and buildings to the west and south of the fort demonstrates that there is a great deal of other activity in this landscape some of which may relate to the pre-fort occupation. The enclosures to the west of the fort in particular are especially degraded and may represent earlier features or at least those associated with the first phase of fort construction.

The location of the cemetery so far away from the fort also suggests that those buried there may not have been the occupants of the fort, but another earlier community, perhaps inhabiting the enclosures to the south. Evidence from the pottery spreads and the walls associated with them may also provide information on (earlier or later) communities.

The preservation of archaeological remains at Qal'at Murayr, both above ground and below ground, is generally good. Although no standing structures survive the quantity and quality of evidence is such that further investigations at any part of the site are likely to provide useful information on the history of this landscape including pottery and coin evidence to support phasing of the various activities. Excavations revealed that archaeological sealed deposits within the fort itself will almost certainly contain evidence of a date of foundation either through pottery evidence or through dating of charcoal or preserved organic material if excavations were to go to this depth.

In the next instance it will be vitally important to gain a better understanding of the ceramic material and other material culture recovered from the soundings. This will enable a much better dating of the origins of Qal'at Murayr and its demise. This has to be carried in conjunction with work on the ceramic sequence from Al Zubārah, which will provide a comparative assemblage.

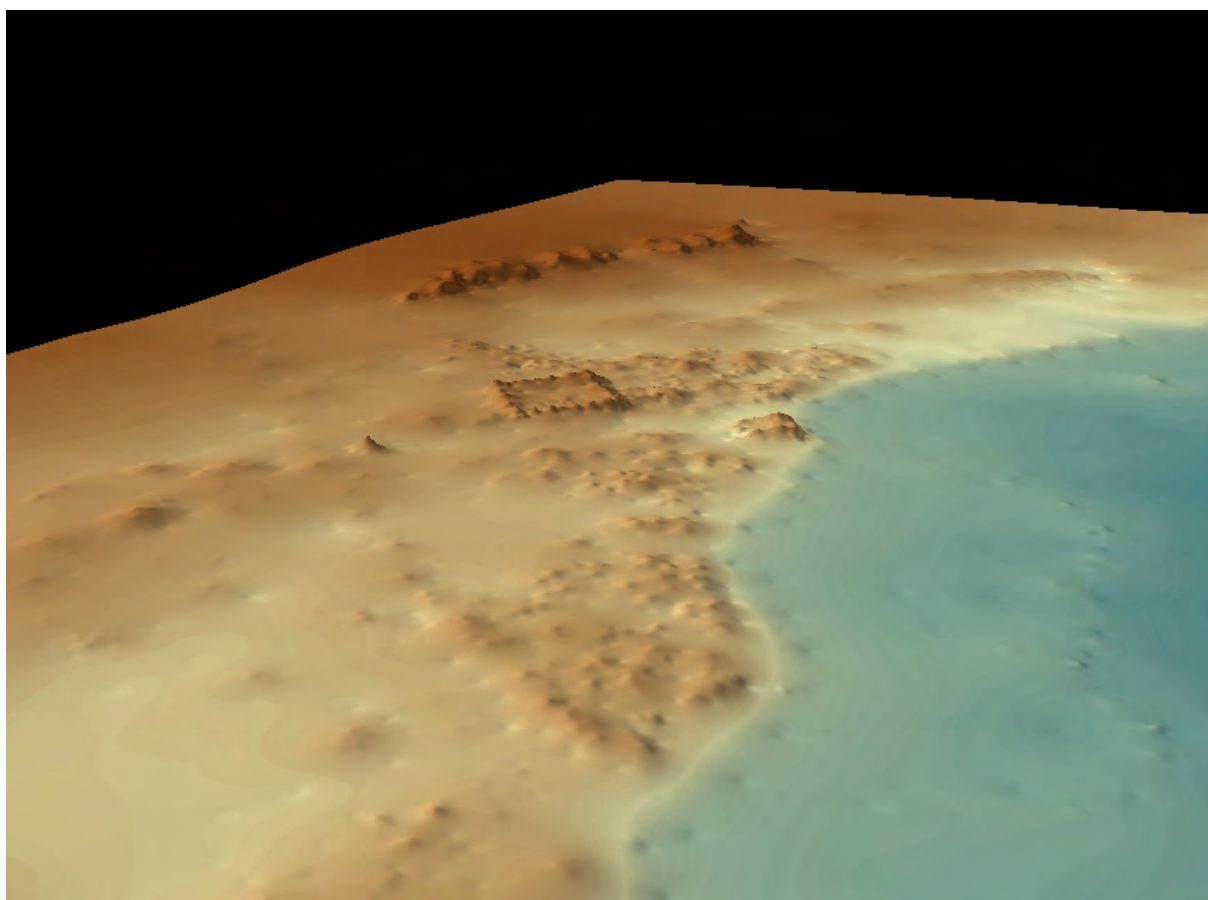
## 8. Furayhah

*Gareth Rees*

### 8.1 Introduction

Investigations at Furayhah, 3.5k to the north of Al Zubārah, aimed to create a topographic map of the surviving remains at the site and to determine the depth, quality and extent of preservation of the archaeology of the settlement (see Section 3.4). Survey was carried out prior to excavation with trenches targeting over specific features that had been identified during the survey. The total area surveyed and included in report encompassed an area of 70ha, with the main building activity identified in a band 250m wide and 1km from south to north fronting on to the sea.

The most prominent remains stretching for on the site is Qalʿat Furayhah which was excavated in 2005 by the QMA. These excavations also included a 20m by 20m trench to the south of the fort. The second largest structure within the settlement was identified during the survey is situated c. 45m west of Qalʿat Furayhah and situated directly on the beach. It produced evidence for column bases and collapsed arches. The alignment of the far western wall suggests that it may have been a *qiblah* wall, indicating that the building may have been a mosque. A substantial cemetery containing c. 650 buri-



**Figure 8.1:** Terrain model of Furayhah overlain with the modern setting of the study area

als is located to the south of the settlement, whilst another smaller walled cemetery is located to the north. Middens were identified around and within all parts of the settlement and excavations were conducted of the largest to gain an initial idea of the settlements chronology. An area of much more fragmentary building remains associated with eroded middens was identified to the east and may provide evidence for an earlier settlement. These buildings, cemeteries and middens provide evidence for an extensive settlement, which may have shrunk over time towards to the south where a final, shorter lived phase of construction and occupation, was situated. Inter-tidal stone built fishtraps, surveyed in the sea just off-shore, provide evidence for the economy of some of the people who have occupied Furayhah at one time.

## 8.2 Topography and Setting

The settlement of Furayhah had close connections to coastal economy and maritime and coastal activity. The majority of building remains were located within 100m of the current shoreline. The terrain rose slowly from around 1m above local datum (A.L.D.) on the high-tide mark to 4.3m A.L.D. to the east of the surveyed area (Figure 8.1). The only prominent topography in the area were the rock outcrop of Jebel Furayhah that represents the southeast of the study area. They rise steeply out of the desert to heights of over 7m A.L.D. The jebel consists of several promontories of aeolianite which were formed from fossilized late Pleistocene dune systems (Macumber 2009, 4). These rocks are scattered with cup-marks often suggested to be of a prehistoric date.

The inter-tidal zone undulates greatly with outcrops of limestone being visible for almost 1km from the shore. The average high-tide covers this area with less than 2m of water at the deepest points. All of this area is exposed during low tide. There is no natural, deep harbour, and it is therefore unlikely that large boats would ever have been able to land at Furayhah.

The modern setting of the site is dominated by an abandoned walled villa situated to the south, while in the north a series of buildings and tents, which were occupied at the time of work, demarcates the other end of the survey area (Figure 8.2). No obvious traces of archaeology were seen to the north of



**Figure 8.2:** Setting of the survey. Qal'at Furayhah in left foreground and abandoned villa in background. Facing south



these buildings and tents, suggesting that they represent the northernmost extent of Furayhah. Several semi-permanent tented encampments were also present along a ridge of high ground to the east of the study area.

Access to the site was from a tarmacked road built to access the villa. A large regularly used unmetalled track emanated from this and crossed the site from south to north. Many such tracks criss-cross the site and these often run over walls and middens causing considerable erosion and damage. Sections of one of these tracks, in the centre of the site running south east from the shore, may have been deliberately made by machine but all of the others appeared to have been created and maintained to the present day by repeated vehicles use.

An area of 1.2ha of land adjacent to the shore in the north of the site had been levelled and covered with rubble hardcore. It was clear from the survey that this levelling had destroyed the remains of a large number of buildings, although it is possible that some remnants were buried beneath the rubble.

Two cemeteries existed within the site both of which were previously been identified by QMA surveys. The northern cemetery is surrounded by a substantial wall up to 2m high. The cemetery to the south was marked out by road-irons the location of which were recorded prior to the survey of the cemetery. An attempt had been made to build a wall around this cemetery, too - as evidenced by a segment of partially constructed wall - but this was abandoned.

## **8.3 The Survey**

The survey was undertaken using Leica 1203 and S09 TST total stations set up on a base line (stations S101 and S102) the location of which was set out from two known Qatar National Grid (QNG) datum points. Four subsidiary stations were set out directly from this base line (S103, S104, S105, S106). These included height data taken 25m apart across the site in order to create a terrain model of the landscape (Figure 8.1).

All identified features were surveyed regardless of form, function or relative phasing to provide an objective account of the current state of preservation, occupation and use of the landscape of Furayhah (Figure 8.3). Features were identified over an area that measured 0.6km from west to east and 1.3km from south to north. The predominant features identified were the remains of walled buildings. These were generally better preserved in the south of the site, while those to the northeast and east were most highly degraded.

### **8.3.1 Buildings**

Walls lines survived up to 0.5m in height but were generally evidenced by linear mounds of rubble and soil overburden consisting of unworked naturally occurring limestone blocks up to 500mm wide. The plans of individual buildings could be made out at the south of the site with large outer walls surrounding large rooms or courtyards, which are associated with suites of smaller rooms and isolated ancillary buildings (Figure 8.4). It was not possible to identify a single complete building, although two buildings identified at the far north of the site were well preserved with near complete plans. No common alignment could be identified among the remains. The size of the buildings was relatively uniform throughout the site, although as degradation of remains was more advanced to the

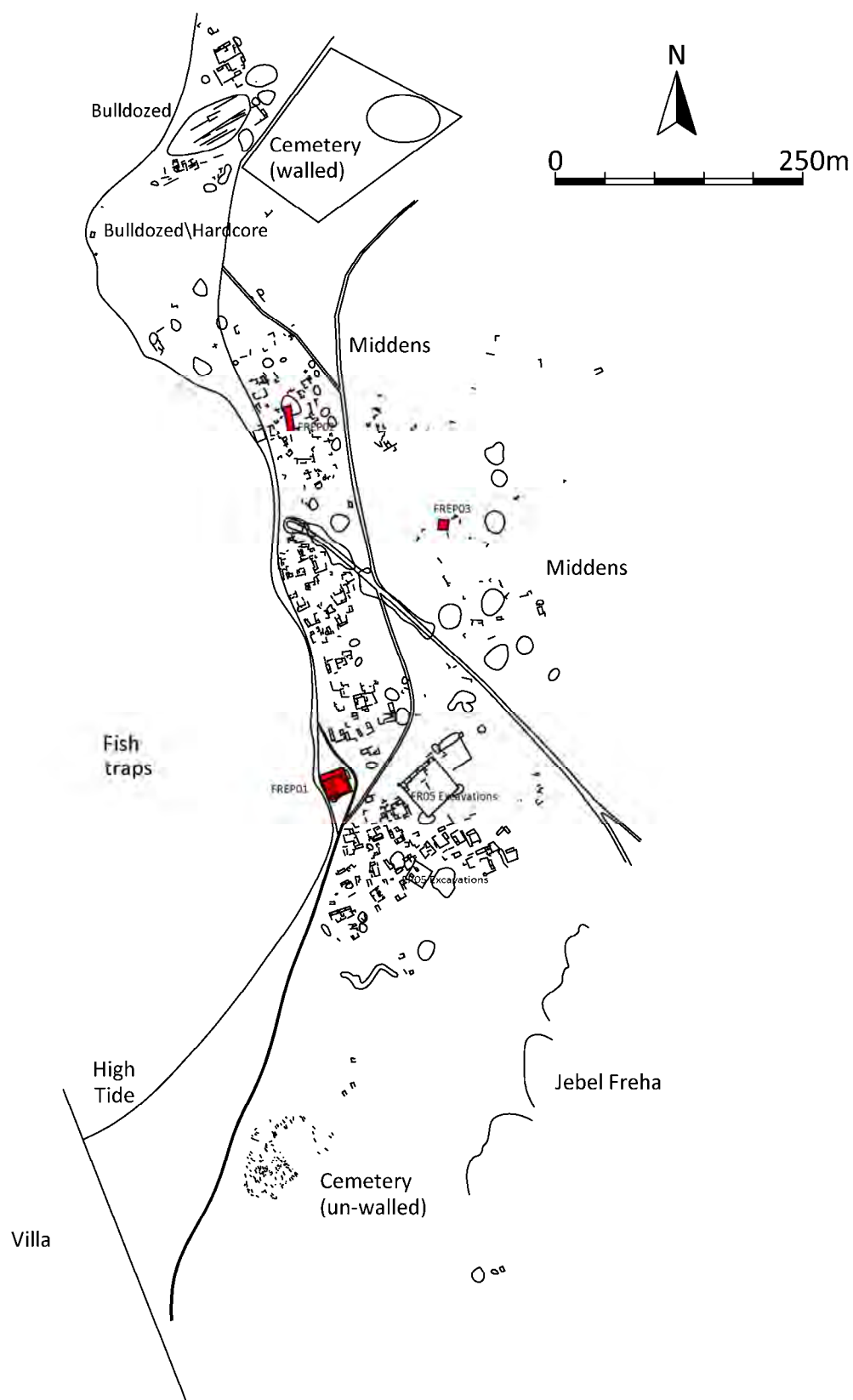
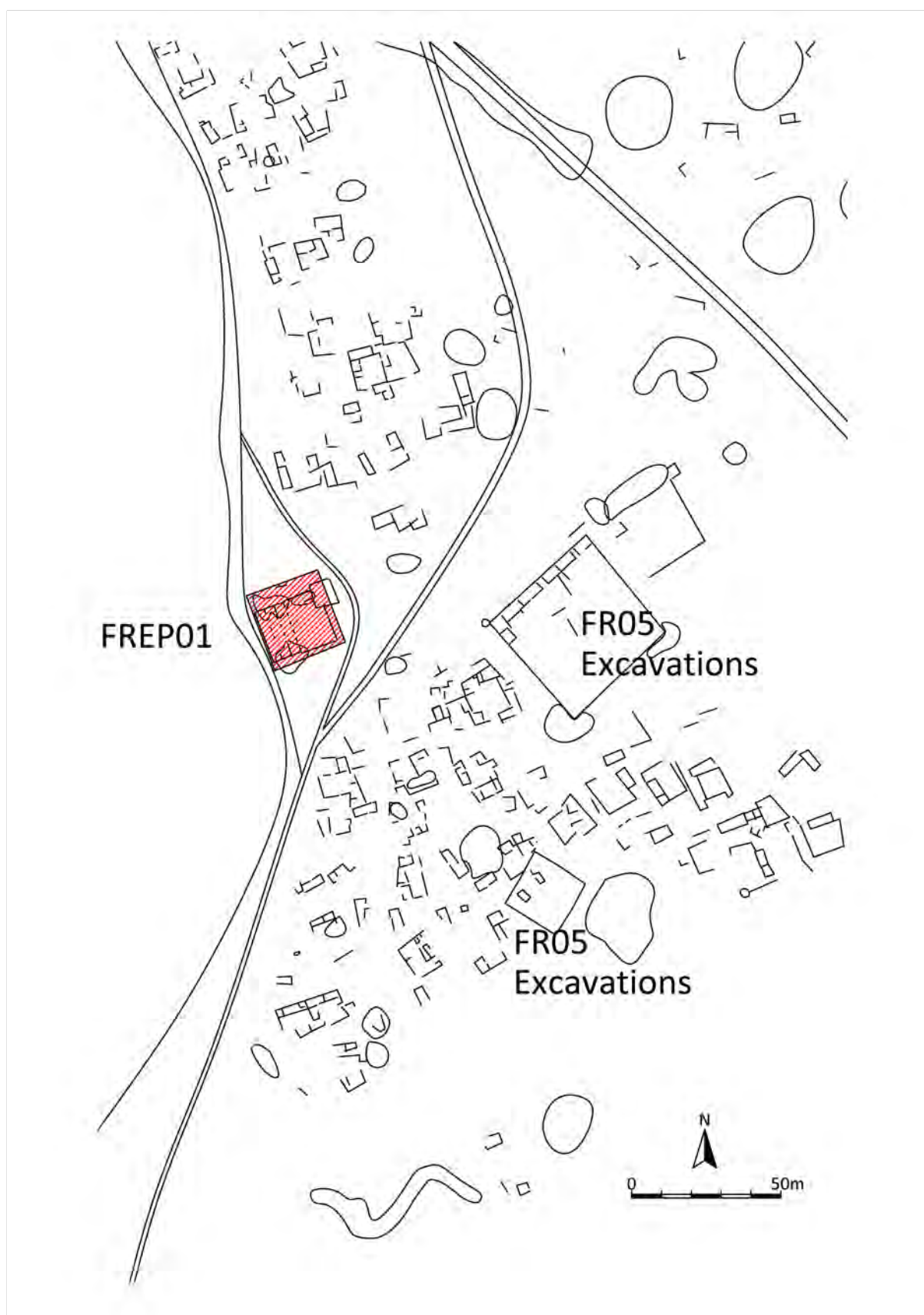


Figure 8.3: All features plan



**Figure 8.4:** Buildings identified to the south of the linear midden

north and east of the settlement, it was harder to make out complete room plans. The courtyard spaces tended to measure around 10m by 12m whilst the smaller rooms were between 3m and 5m in length and measured c.3m in width (Figure 8.5). There were differing levels of preservation amongst the best preserved ruins indicating that newer structures may have been built over or reused structural features of older ones.

To the north of a linear midden overlain by a modern track the state of preservation decreased significantly (Figure 8.6). Only fragmentary wall lines were identified here but it was clear from the extent of the rubble that these buildings may have been of a similar scale and layout to those to the southern ones. Only four cellular rooms were identified whilst longer discontinuous lengths of wall indicated that larger rooms or courtyards may have been up to 16m wide. Many of the remains in this part of the site were covered with rubble from collapsed walls.

The best preserved building in this area lay between the high-tide line and the modern coastal track. The walls of one complete space survived forming a room measuring 12m by 10m with what may be a possible entrance in the north west. These walls continued to the east of the modern track and to the north west indicating that this room was originally part of a much larger building. This room was the third largest preserved space within the study area and its current state of preservation may indicate that it continued to be in use for longer than the other buildings.

A series of particularly well preserved walls that may have formed one or two buildings marked the northern extent of settlement (Figure 8.7). These structures lay to the north of an area where other structures appear to have been demolished. These buildings contained courtyards measuring up to 25m long and 12m wide which were associated with small rooms at the edge of the compounds and a discrete ancillary building to the north west.

The two largest structures in the settlement were particularly well preserved. The previously excavated Qal'at Furayhah and the mosque 50m to the west.

### **8.3.2 Qal'at Furayhah**

Excavations of Qal'at Furayhah in 2005 uncovered a well preserved outer wall including towers on at least three sides. The outer wall currently survives to a height of 1.6m and where excavations have removed the rubble it measured between 0.7m to 1m in width (Figure 8.8). The outer wall enclosed an area of 42m<sup>2</sup> and was aligned north east to south west. There were no breaks in the course of the wall but it survived with only a few courses at a point in the northwestern segment and this may have represented an threshold\entrance measuring 2.5m in width. The eastern tower had been cleared of rubble in 2005 measuring 2.5m in diameter (Figure 8.9). The towers to the south and west survived only as mounds of rubble, which have not been excavated (Figure 8.10).

Within the building a series of cellular rooms had been uncovered abutting the north western wall (Figure 8.11). These rooms measured 3.5m wide and varied in length from 6m to 8m. The rooms were formed by walls 0.7m wide and were accessed from the inside of the main building. A *madabas* survived in one of these rooms.

Outside the north eastern wall of the main building the fragmentary remains of a rectilinear walled structure survived. These consisted of two wall lines, one to the south east and one to the north east,





**Figure 8.5:** Examples of some of the best preserved remains



**Figure 8.6:** State of preservation of buildings to the north of linear midden



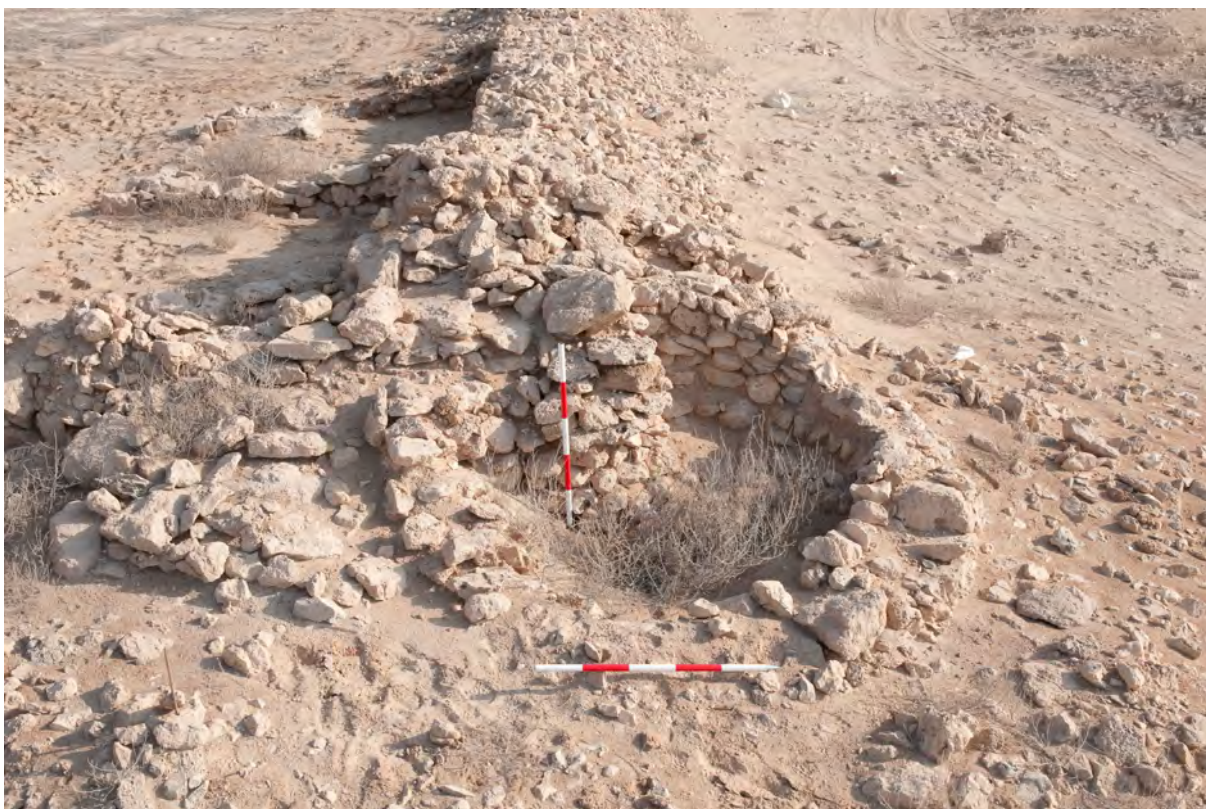


**Figure 8.7:** Well preserved buildings to the far north of the study area



**Figure 8.8:** Southern wall of Qal'at Furayhah.  
Facing east





**Figure 8.9:** Eastern tower of Qal'at Furayhah



**Figure 8.10:** Rubble mound at southern corner of Qal'at Furayhah

with a third wall represented by a linear rubble mound to the north west. All survived only at the level of the ground surface. The space within these walls measured at least 22m by 23m. A three sided walled structure adjacent to the north eastern edge of the north eastern wall may have been a small room associated with the main building or the remains of an external installation such as a tower.

This building was closely associated with and may be overlain by the remains of Qal'at Furayhah. Viewed independently from Qal'at Furayhah this structure would still be the second largest structure on the site, enclosing a larger area than that of the mosque excavated to the west (FREPO1). These remains may represent an earlier phase of Qal'at Furayhah or an enclosed courtyard associated with it; however, they were not aligned with the surviving walls of the fort. The orientation of the structure differed by only 15° to that of the corresponding wall of the building in FREPO1, which we identified as a mosque (see Section 8.4 below). The similarity in alignment, overall size, and the possible foundations of a tower suggest that this may be the remains of an earlier mosque. However, until further excavations can be carried out this remains untested.

## 8.4 The Mosque



**Figure 8.11:** Cellular room abutting the NW wall of Qal'at Furayhah excavated in 2005



Located 50m to the west of Qal'at Furayhah a structure measuring 22m by 18m was identified, which had a WSW\ENE orientation along its longitudinal axis. Walls survived around all sides of this structure except in the north eastern corner where was truncated (Figure 8.12). The northern wall and the south western corner were indicated by large mounds of rubble up to 2m in height. Several internal features were visible including the remains of a partition wall 7m from the WSW outer wall. The outer section of the WSW wall had been highly eroded by the tide, which regularly reaches the base of the wall. Following cleaning a mortar lined niche was visible in the centre of this wall (Figure 8.13). Given the central position of this feature in the wall and its alignment with internal features this niche may represent the remains of a *mihrab*, suggesting that the WSW wall is the *qiblah* wall of a mosque.

#### 8.4.1 FREP01

This trench encompassed all deposits located in and in the immediate vicinity of the structure. Only two deposits were removed from this building during this season exposing wall lines and internal features to record them (Figure 8.14). The mixed overburden deposits (2) consisted of a loose coarse grained wind blown silty sand that was 0.05m to 0.1m thick. The removal of the overburden revealed rubble deposit (16). This layer appeared to represent the last stage of building collapse and included large pieces of masonry, mud-plaster, mortar and smaller stones from interior features. A large pierced stone that may have once been an anchor and a fragment of grinding stone were found amongst this rubble and may have been reused as part of the construction of the building. Three complete vessels, dating to the late 19<sup>th</sup> and 20<sup>th</sup> centuries, were uncovered in between partition walls at



**Figure 8.12:** Post-excavation view of FREP01, facing WSW

their southern end amongst the windblown sands and rubble (Figure 8.14). They do not date the construction of the building, but its last phase of use following collapse. These vessels were associated with no other evidence of occupation. Excavations ceased at this point but had uncovered a substantial amount of intact masonry (Figure 8.15).

Wall <39> formed the south east and north east facing limits of the building. It survived up to 0.42m high and measured 0.64m wide. It consisted predominantly of limestone blocks with some flint and beach stone in the core. This wall was well bonded with mortar, but randomly coursed. There was no evidence of a plaster render lining on this wall at this level. A small rectangular hole had been built into this wall which may have functioned as a drain (Figure 8.16). Eight metres to the NNW of the SE corner of this wall a break in the wall was uncovered. The wall continued as wall <38> to the NNW. This gap was located along the centre line of the building and is likely to have been the main entrance to the building. The NNW course of wall <38> was truncated by a large modern pit. This sub-square feature measuring 8m by 8m, was dug down to beyond the level of the foundations of the structure and then back filled with modern refuse. The location of this cut on the corner of the structure may indicate that it resulted from robbing building material. The size of the truncation may indicate that a larger structure, perhaps a minaret, stood here. This is suggested by the lack of obvious tower foundations elsewhere in the structure and analogy to other historical mosques in settlements historical settlements nearby. The outer wall continued in the form of wall <40> to form the eastern segment of the NNW wall of the building. Wall <38> could be seen in the sections of the modern truncation to overlie an earlier wall that had been built on a slightly different alignment. It was clear



**Figure 8.13:** Niche, possible mihrab, in Qiblah wall FREP01. Facing ENE

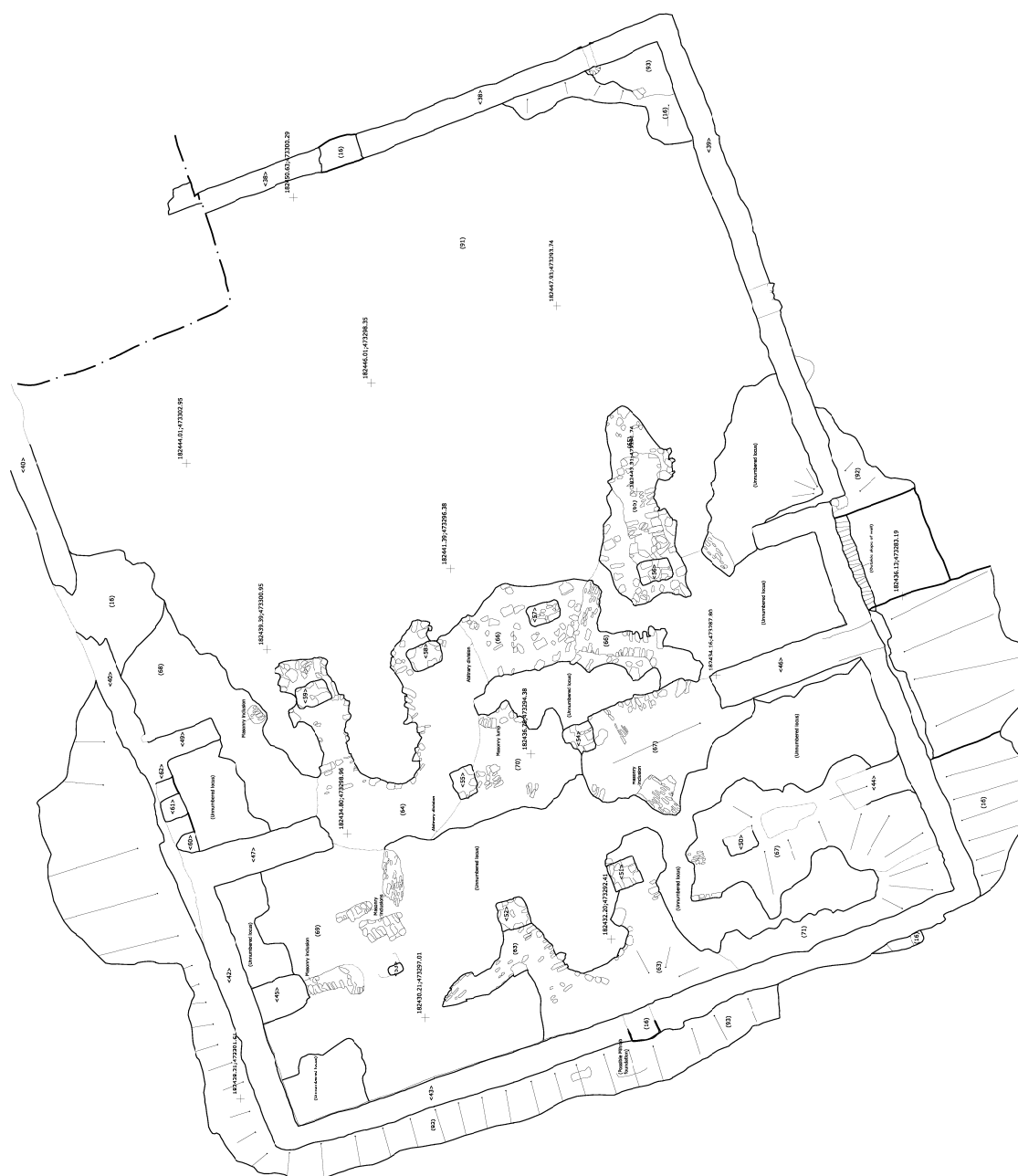


Figure 8.14: Plan FREP01 post-excavation.





**Figure 8.15:** Vessels deposited in rubble of FREP01



**Figure 8.16:** Drain in wall 38, FREP01. Facing WSW.





**Figure 8.17:** Wall <39> (foreground) overlain by wall <48>\<41>. Facing WSW

from this section that at least two construction events had taken place during the life of the building. The remains of another wall were seen in section parallel to wall <40>.

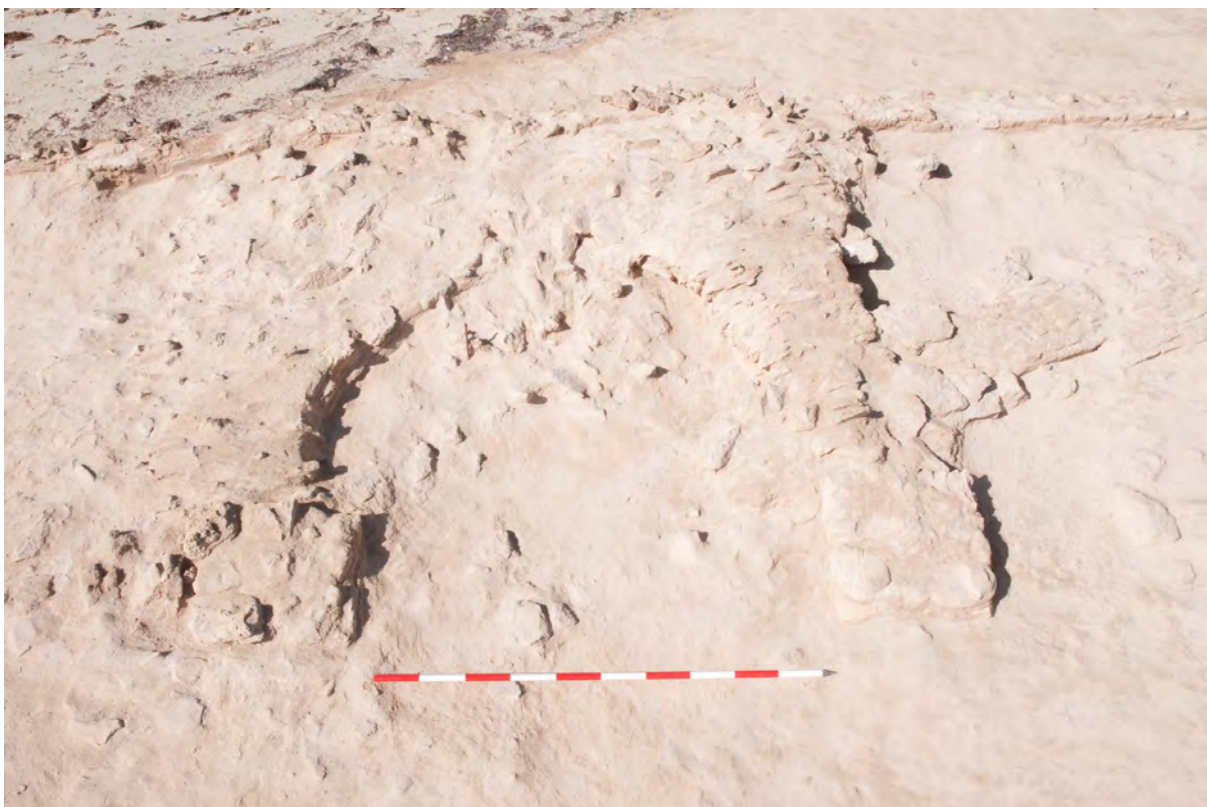
Walls <38>, <39> and <40> formed a large space at the ENE of the structure that measured 12m by 18m. The edges of a mortared basin (93) were uncovered in the ESE corner of this space. This feature was not fully excavated in order to avoid further erosion. The basin sloped down towards the drain located in wall 38 and presumably was associated with this feature, likely providing a ritual washing facility for the faithful.

At its WSW end wall <39> turned ninety degrees NNW and continued for 1.6m before it terminated. At this point it was overlain by wall 41 which then continued in a WSW direction for 9m, slightly off-set from the original course of wall <39> (Figure 8.17). This wall continued to form the limit of the building to the WSW and NNW as walls <42> and <43>. These walls consisted of up to 90% beach stone with some limestone and a lime-mortar bond. They survived to a maximum height of 1.7m and measured up to 0.75m wide. The WSW segment of this wall <43> was severely eroded with over half of the width being lost to the sea in places. This erosion has revealed the construction methods of the wall and the plastered niche thought to represent the mihrab. Two or three courses of limestone appeared to be present at the base of this wall with a layer of rubble placed on top, before several more courses of limestone were laid. The upper courses and the core of the wall were predominantly constructed from beach stone.





**Figure 8.18:** Fallen arches associated with column bases <58> and <59> (just behind 2m scale). Facing SW



**Figure 8.19:** Fallen archway aligned with possible mihrab and column bases <51> and <52>. Facing west

Beach stone was seen to have been laid vertically on either side of the possible *mihrab* (Figure 8.13). This may indicate that the wall once continued around this feature but has since been eroded. Cleaning of the beach material below the mihrab feature did not reveal any evidence of this projected wall. Excavations on the outside of wall <41> uncovered a mortar layer abutting the lower courses of the wall. This layer was set amongst a compacted fine reddish silt. This deposit may have been designed to provide some defence from the encroaching sea.

Walls <48> and <49> were bonded to the ENE termini of walls <41> and <42>, respectively, and formed short lengths of an internal division between this newer phase of construction and the older phase represented by walls <38>, <39> and <40>. This internal division was seen to continue in the form of four column bases <56>, <57>, <58>, <59> set 2.2m apart between these two walls. The rubble remains of fallen arches directly associated with these column bases was uncovered to the WSW of them (Figure 8.18).

Three metres to the ENE of the outer WSW wall <43> another line of four columns <50>, <51>, <52>, <53> was uncovered. These were less well preserved at this level and were associated with short lengths of wall <44> and <45> that abutted the outer walls to the SSE and NNW. These column bases measured 0.7m square and were also spaced 2.2m apart. The remains of a collapsed archway were uncovered associate with the two central column bases <51> and <52> (Figure 8.19). The archway was aligned with the possible entrance at the ENE and the feature that may have been the *mihrab* at the WSW.

A third internal partition was uncovered 2.8m from column <51> and 2.6m from column <57>. This partition ran parallel with the other two (previously discussed). It consisted of two lengths of wall <46>, <47>, and two column bases <54>, <55> measuring up to 0.8m square. Walls <46> and <47> appeared to have been constructed differently from other walls in the structure. They consisted of up to 90% beach stone with some limestone and mortar. The bond consisted of a fine light reddish brown silt that was not uncovered in any of the other walls in this structure. Wall <46> appeared to have been a later addition to wall <41> with wall <46> abutting wall <41> on either side, which may have been knocked through to facilitate construction of <46>. Both walls <46> and <47> had the remains of lime plaster on their ENE face (Figure 8.20). The column bases were 2.4m apart and formed part of the central columned and arched space leading from the entrance in the ENE to the possible mihrab to the WSW.

Given the characteristics of the structure identified in FREP01 it is likely that this building was a mosque. The orientation of the western wall, which contained the suspected mihrab, suggests that this is the *qiblah* wall. The division of space into a large open space a the 'front' of the building, with a more ornate and divisive space towards the 'rear', is also indicative of regional mosque architecture. The presence of carefully constructed masonry in the building's interior also hints at its special character.

## 8.5 Buildings to the east



**Figure 8.20:** Remains of lime plaster on wall 46. Facing WSW

Located to the east of the modern north-south track and 120m north of Qal'at Furayhah an area of very fragmentary remains was identified. These remains, generally of rectilinear shape, survived in an area that measured 263m west to east and 337m south to north (5.2ha). They survived only a few centimetres above the ground surface with fragments of wall lines suggested by alignments of cobbles, and rooms by rectilinear patches of darker soil. Due to the state of preservation no common alignment could be identified amongst these structures. The presence of six large middens to the south and east of this area may suggest the location of a substantial settlement. To the south of this area remains tended to be located on low mounds, about 0.3m high, some of which may have been natural outcrops and others may have been built-up through continuous occupation. One of these mounds, in the centre of the eastern building area was investigated with a 10m by 10m trial trench excavation.

### 8.5.1 FREP03

Trench FREP03 targeted three alignments of cobbles that appeared to surround dark, organic deposits thought to represent occupation or refuse deposits. These remains were typical of many identified in this area and so this excavation was intended to clarify and characterise the nature of these remains.

After the removal of overburden (3) four primary occupation spaces were identified (Figure 8.22), each defined by wall foundations constructed from cobbles (up to 180mm) with a light reddish brown silty bond set into a compacted fine brownish yellow silt. Space 1 was formed by wall <107>\<119>



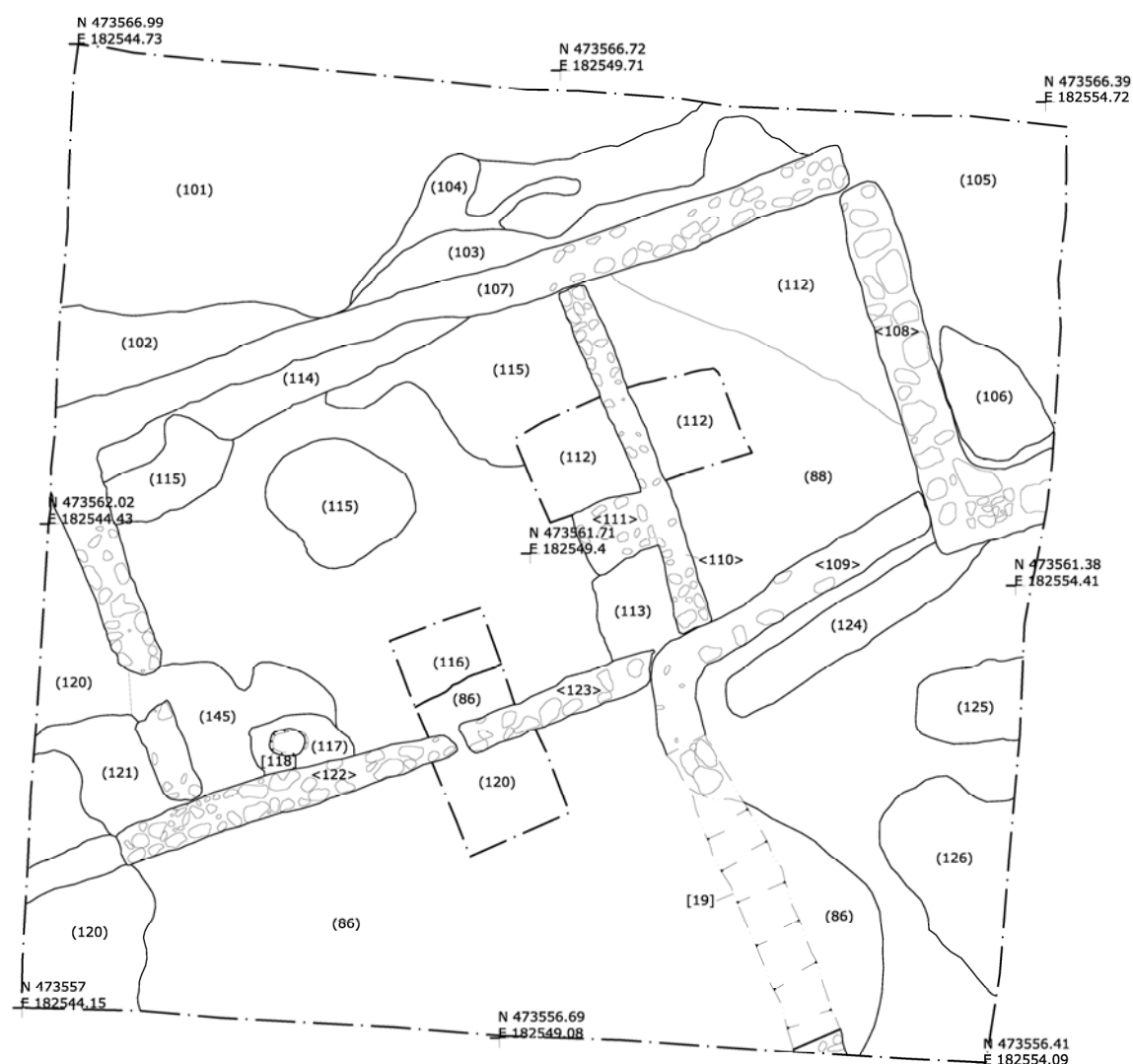


**Figure 8.21:** Photo – Space 1, FREP03 facing SE

to the WSW and NNW, <110>\<111> to the ENE and wall <122>\<123> to the SSE (Figure 8.23). Walls <123> and <110> abutted wall <109> and appeared to be later than it. These walls were placed in shallow foundation trenches truncating midden deposits of earlier phases of occupation. Wall <107> consisted of a NNW\SSE segment and a WSW\ENE segment. The latter was the NNW boundary of both Space 1 and Space 2. Space 1 was created by placing an internal partition (110) perpendicular to this wall.

Removal of wall rubble (21), (33), (34), (35), (12) and (100) uncovered a light orange-brown, friable deposit with very few inclusions. The deposits abutted wall <110>\<111> and <122>\<123> and was thickest (up to 0.2m) where it met these walls. The consistency of this layer was similar to that of the silts found within the walls and it is possible that it represents the remains of mud-brick walls that had weathered and 'melted'. This process was seen mid-way through the erosive state at the site of an abandoned village c.1km east of Furayhah (see Section 9; Figure 8.23). A sequence of deposits (75, 83, 73 and 113) uncovered between wall <111> and <123> appeared to be the remains of several late resurfacing events and associated occupation deposits. They were preserved only in this small area. This may indicate that they were located in a small room separate from the rest of the space or that the shelter provided by walls on three sides preserved surfaces and occupation that had spread over the whole of Space 1 but are now eroded.

Mixed dark sandy silt deposits (9) and (31) overlay occupation deposit (87) in this space. Locus (87) was excavated only in a 1m by 1m sondage next to wall <122>\<123> in order to establish its depth and characterise the deposit and its relationship with the wall. It consisted of a mid grey brown soft

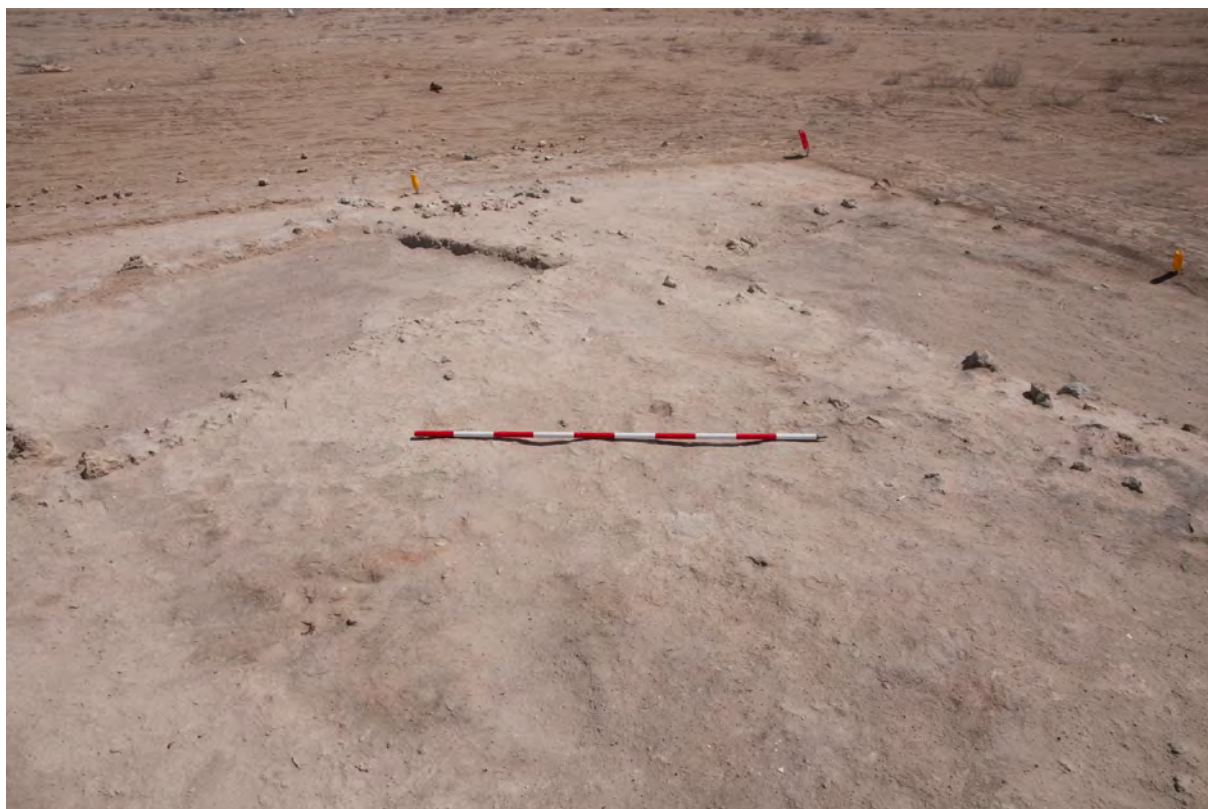


**Figure 8.22:** Plan FREP03 post excavation

fine sandy silt and was 0.14m deep. It was found to abut wall <122>|<123>. A gap identified at this point in the wall (between <122> and <123>) may indicate the location of a vent or drain. This deposit was rich in pottery, animal bone and shell indicating that it may represent middening in an abandoned room. Deposit (87) was associated with a greyer more compacted silty deposit that overlay it (115). This may indicate a change of use of this space after the main middening event and before the primary wall collapse. Deposit (115) survives only in patches and was unexcavated in March 2010.

The upper occupation in this space was represented by surfaces (114), (116) and (145). These consisted of compacted coarse grained silty sands. The current excavation was not extensive enough to prove whether all three surfaces represented the same phase of activity.



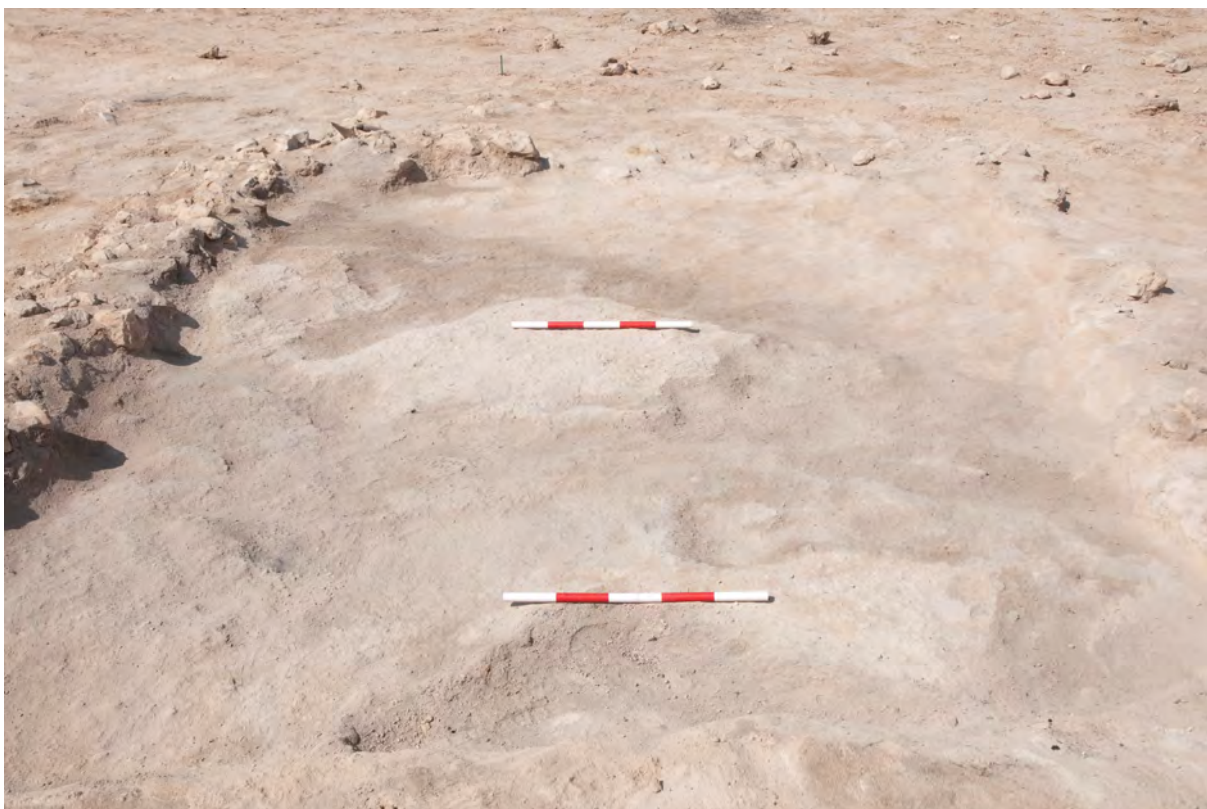


**Figure 8.23:** Comparison of locus (37) with erosive processes seen at nearby settlement



**Figure 8.24:** Vessel in fill (78) of taboon [118] FREP03. Facing east





**Figure 8.25:** Space 2, FREP03: surface layers and associated middening deposits.



**Figure 8.26:** FREP03 post-ex. Sp.1 background, Sp.2 foreground, Sp.3 top left, Sp.4 front left. Facing South

A loose dark grey brown silt (117) with frequently occurring charcoal inclusions was uncovered around a circular ash filled pit [118]. This pit had been cut or built into surface (145) in the south western corner of Space 1, and had been lined with a fine silt or clay (80), which was reddened by *in situ* burning. The lining was only identified around the sides of the pit, the base being formed by small immovable rocks that may have represented a natural deposit. The basal deposit of this pit (79) had an ashy consistency containing 30% charcoal indicating that it may have been the remnants of the original use of this pit. The lower secondary fill (78) contained many fewer inclusions but did contain the semi complete remains of the top half of a jug with one handle (Figure 8.24). This feature is likely to have been a *tannūr* or small oven and the reddening of the lining indicates that it was used for *in situ* burning.

Space 2 was divided from Space 1 by wall <110>. It was bounded to the NNW by wall <107>, to the ENE by wall 108 and to the SSE by wall <109> (Figure 8.25). All of these walls, except wall <110>, were reused from previous phases of occupation. Wall <108> appeared to be the earliest wall. It survived as an 'L' shape abutted by wall <109>. It was 0.46m wide and was constructed from sandstone blocks and light reddish brown silty bonding material. There were no cobbles in this wall. Wall <109> was also an 'L' shape with a NNW\SSE segment and a ENE\WSW segment. It was abutted by walls <110> and <123>, which was 0.44m wide and had been built in a construction cut [19] that truncated layer (86). This wall contained very few cobbles and was primarily evidenced by a mid orange brown friable sandy silt, taken to be the base of a mud-brick wall.

Lying immediately below the overburden, layer (7) abutted all of the walls of this space. It consisted of dark sandy silts 0.1m thick that may have derived from the deposition of humic material. It contained large amounts of ceramic, animal bones and shell as well as metal working slag suggesting that this space may have been the location of general refuse dumping or middening. Midden deposit (7) overlay compacted sandy-silt surface (14). This surface was highly eroded, surviving only as a patch in the southern corner of the room. This surface overlay an occupation or midden deposit 0.08m thick. Removal of this occupation uncovered surface (26). This surface survived better than (14) but was still concentrated to the south of the room. All of these layers contained a large amount of ceramic, animal bone and shell as well as other datable material. This surface had been constructed over midden deposit (13)\(88=89). This deposit abutted walls <107> and <108>, but was seen to run underneath wall <110>. This indicated that wall 110 was a later addition to this structure. The relationship of wall <109> with locus (88) was not established this season. Deposit (88) overlay surface (112) which abutted walls <107> and <108> and also ran underneath wall <110>.

Located to the south and south west Space 3 was bounded to the NNW by wall <122>\<123> and to the ENE by wall <109> (Figure 8.26). No surfaces were identified in this space and it was primarily defined by midden refuse deposits (8) and (86). These deposits contained a large amount of cultural material and continued under wall <122>\<123> and wall <109>. The foundation cuts of these walls, [11] and [19] were seen to truncate them. Deposit (86) overlay firm, coarse grained silty sand surface (120). This surface was also identified further to the north, west of wall <119>. This surface's relationships with these walls indicates that it was part of the construction of an earlier phase of structure in this area. It appears to have gone out of use and been levelled off with midden material before the construction of the walls of Space 1 and Space 4.

Space 4 was located to the south east of the trench and was bounded to the NNW by walls <109> and <108> and to the WSW by wall <109>. After the removal of rubble and natural accumulation layers (20) and (24) layer (32) was uncovered. This layer contained moderate amounts of stone and charcoal as well as ceramic, animal bone and oyster shell and it may represent an isolated dump of material. Layer (72), below, was a compacted surface-like deposit that abutted wall <109>, although its thickness varied greatly and its inclusions were mixed. It is possible that deposit (32) represents occupation on a layer of wall collapse (72) reused as a temporary surface. Given that wall <109> appears to have been constructed from mud-bricks it is likely that collapsed material may have fallen to this side. Perhaps occupation using the remains of this wall for shelter is what caused the mixed nature of deposits (72) and (32). Evidence of the original occupation of this space was uncovered below (72). The sequence of deposits within this space consisted of an upper degraded surface (126) which had been constructed on thin occupation deposit (82). This occupation related to lower surface (125). The relationship of these surfaces to wall <109> was not clear, but they appeared to be constrained by it.

Wall <124> was also exposed after the removal of (72). This wall which ran almost parallel with wall <109> was overlain by wall <108>. It is possible that surface (125) and occupation (82) related to this earlier wall.

Several deposits were uncovered outside of these spaces. Surface (102\103) lay to the NNW of wall <107>. It was highly degraded and overlay a series of sub-surface deposits that had been partially exposed due to erosion of the mound on which the building was located. Surface (106) lay to the ENE of wall <108>. It clearly abutted the wall and continued under the eastern baulk.

The sequence of deposits uncovered in trench FREP03 indicate the presence of shallow but complex archaeological deposits. At least four episodes of wall construction were identified with further phases of reuse of earlier walls and the deposition and archaeological material-rich midden deposits. It is likely that preservation in this area is less substantial due to a possible tendency to build with mud brick; however, the eroded material from these bricks has preserved a substantial amount of material below it.

## 8.6 Middens

Features identified as middens were located in all parts of the site with concentrations found to the east of the main areas of buildings. They tended to be rounded or sub-rounded mounds measuring up to 27m in diameter with some surviving to a height of up to 0.7m above the ground surface; although many were eroded down to the level of the ground surface. They consisted of dark brown grey sandy silts with frequent mixed inclusions visible on the surface, often including ceramic and shell. A bank of midden material was identified 250m north of FREP01 running NW to SE from the coast for 170m. This bank measured up to 20m in width and survived up to 0.8m above the ground surface. It's shape is unusual for the middens seen elsewhere in Furayhah and Al Zubārah, and other features may be buried beneath it.

To the north of this bank, and west of the modern north south track, midden locations tended to closely follow the edge of the built up areas. Middens associated with the bulldozed areas to the north may also indicate that buildings were once present here.





**Figure 8.27:** Eroded middens around buildings to far north of study area. Facing north

Middens associated with the buildings to the east tended to be larger than those elsewhere and were also more bleached and washed out (Figure 8.27). This difference in form and consistency may be due to a difference in depositional processes here or that this material was deposited before that to the west. These middens also contained ceramic and shell and bone, with a sherd of Iranian stone paste pottery (dating from the 17<sup>th</sup> century) being recovered from a midden 70m NE of FREP03.

Although in general middens appeared to have been placed around the edge of the settlement several were located within buildings or within settlement areas. This deposition may indicate that not all areas of the settlement were occupied simultaneously and when buildings fell out of use they were re-used for the deposition of refuse. This was also suggested by the work in FREP03 (above) where multiple layers of midden deposits had been either dumped into rooms post-abandonment, or had been used to level off degraded surfaces before the construction of new ones.

A large midden measuring 20m in diameter was located in the area of buildings to the north of the midden bank. An excavation trench was located over this midden and what was thought to be the surrounding buildings to investigate the sequence of deposition, the date and relationship of this midden with the nearby buildings.

## 8.7 FREP02



**Figure 8.28:** View along the midden bank facing north west.



**Figure 8.29:** Midden associated with eastern buildings. Facing south

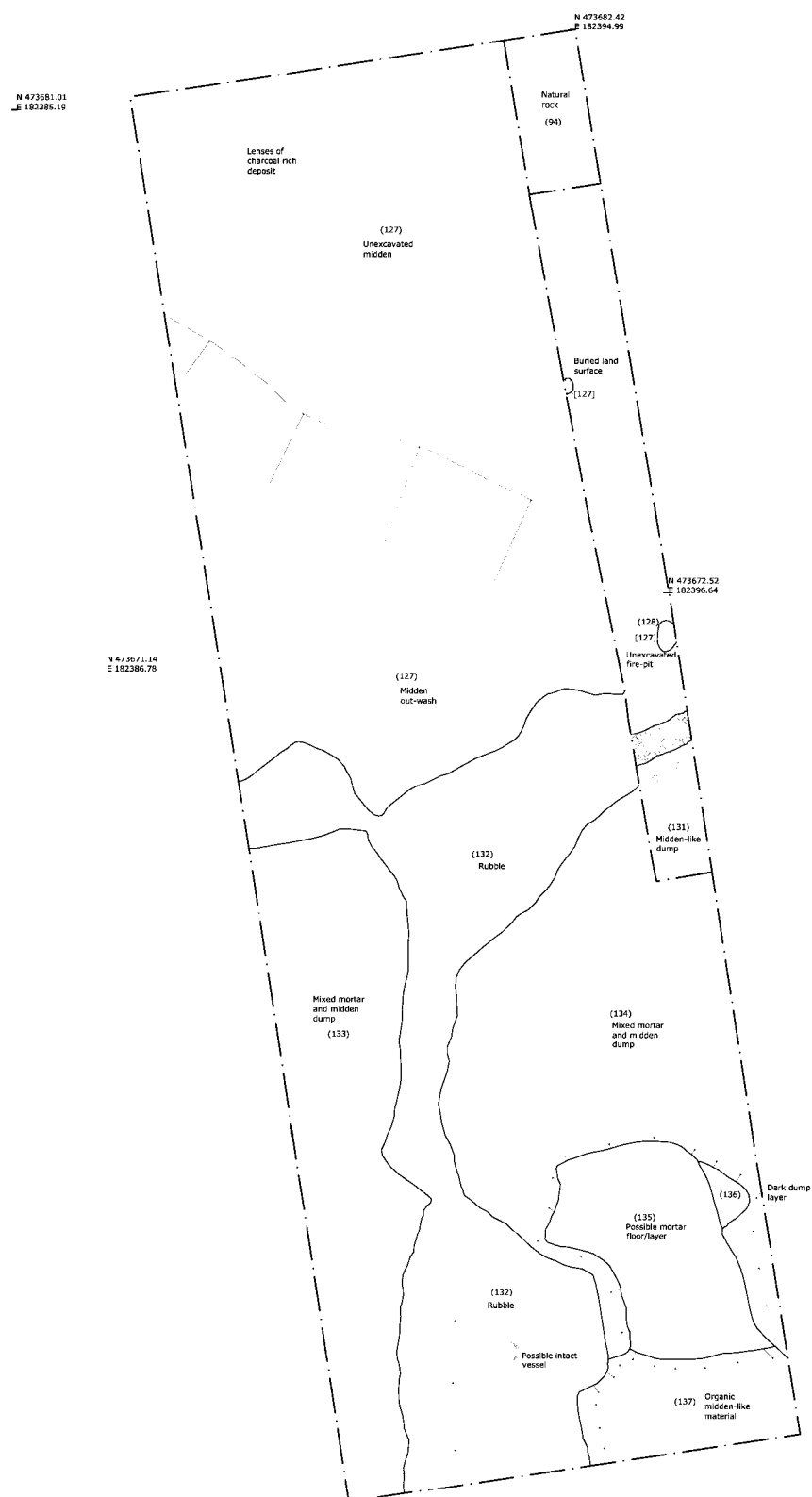


Figure 8.30: Post excavation plan of FREP02





**Figure 8.31:** West facing section of midden in FREP02



**Figure 8.32:** Photograph of west facing section through midden in FREP02.

This area targeted the southwestern quadrant of a large midden that lay within the northern area of buildings and was closely associated with fragmentary wall lines. The excavation area measured 24m by 7m (Figure 8.28).

After the removal of the overburden (4) the midden was excavated in 0.1m spits in order to retain vertical resolution of finds from within a complex sequence of many interlacing lenses of dumps and deposits (Figure 8.29 & 8.30), each of which may not necessarily represent distinct events or phases of activity. All deposits excavated from the midden were sieved on site for artefacts. Two sealed deposits (143, 144) within the midden material were sampled for charred remains and macro-fossils.

The midden consisted of a variety of different types of deposits. Many resulted from the deposition of burnt material whilst other, lighter coloured deposits may represent accumulations of windblown sands. Several of the deposits contained high concentrations of shell whilst all had frequent inclusions of pottery and bone. The relative number of finds recovered from the spits showed that animal bone and shell were particularly prevalent in the top 0.5m and the lower 0.4m of the midden. Pottery was the most common find throughout the midden with its density peaking in loci (29) and (30) between 0.6m and 0.8m down from the top.

A 1m wide sondage was excavated against the eastern baulk to establish the depth of the midden deposits and to identify any underlying features. The midden deposits overlay a brownish yellow coarse sand which contained very few artefacts (95). This deposit may represent the land surface at the beginning of midden deposition. This layer overlay a sterile layer comprised of small rocks (94) that



**Figure 8.33:** Half section of pit [96] showing lining and charcoal rich fill



**Figure 8.34:** FREP02 post excavation. Facing north





**Figure 8.35:** In situ vessel in layer (132). Facing west



**Figure 8.36:** Southern cemetery with large tomb in the foreground. Facing south

was thought to represent bedrock in this area. Two features were uncovered that had been cut into layer (95). Both [96] and [129] were small pits (0.2m and 0.5m in diameter) filled with ash and charcoal rich deposits. Removal of the fills from pit [96] revealed a burnt lining that may have been formed from compacted charcoal accumulated during use (Figure 8.31).

The footings of a wall running WSW\ENE were uncovered below the midden deposits at the southern end of the sondage. These partial remains aligned well with rubble (132) exposed in the south of the trench. Deposits sloped up gradually towards the south of the trench. Rubble layer (76) was excavated in this area after the removal of the overburden. This revealed rubble deposit (132), a mixed mortar and midden dump (133) and a mortar rich deposit (135) (Figure 8.32). A dark deposit with probable humic content (137) lay at the southern end of the trench. A well preserved storage jar type ceramic vessel was partially uncovered in rubble layer (132) (Figure 8.33). This vessel along with the large amount of mortar uncovered in this area and the wall identified in the sondage strongly suggest that the remains of a building lie buried in this part of the trench. Dark midden-like deposit (137) was similar to that uncovered in the rooms of FREP03 to the east. This wall was covered only by the upper layers of the midden that had washed down from the top. It was therefore not possible to say for certain that the original phases of the midden and this structure were contemporary. It is clear that by the later stages of use the northern extent of this building was no longer standing and the rubble layers from it were admixed with the midden deposits.

Excavations in FREP02 and FREP03 have uncovered evidence for the complex sequence of activity that can be expected when excavating around the settlement of Furayhah. It is clear that multiphase activity occurred in all areas of the site with buildings being built, adapted and reused before being used as areas for dumping of refuse. In the case of the building in FREP02 and several buildings to the south of Qal'at Furayhah, this sequence is clear from substantial middens directly overlying buildings.

The location of middens appears to directly relate to the state of preservation in certain areas. Buildings to the south of the linear midden bank tend to be better preserved than those identified to the north of it (see discussion of buildings above). This may indicate that the linear midden, which likely overlies the remains of several structures, was associated primarily with the better preserved area of buildings to the south and may mark the edge of this phase of settlement. Likewise, the line of middens that runs along the east of the buildings north of the bank and west of the north\south track appears to clearly demarcate the area where building preservation is less good. This may indicate that the remains in this area were part of an earlier settlement that had gone out of use by the time the linear midden was built up.

The large and bleached-out middens that mark the eastern boundary of the settlement are closely associated with buildings, like those in FREP03, that survive on the surface as no more than a few lines of cobbles. The most northerly of these midden contained sherds of Iranian stone paste pottery. This pottery dates to earlier than any other on the site, which lends supports to the hypothesis that the most degraded buildings may also be the earliest.

## 8.8 Cemeteries

### 8.8.1 Southern Cemetery

Located 120m north east of the modern villa that marks the south of the study area, this cemetery was extensive measuring 300m NE\SW and 100m NW\SE (2.2ha). Only a sample of the graves were surveyed covering about one fifth of the total cemetery in order to record the general orientation of the graves. A total of 145 individual graves were surveyed predominantly in the south of the cemetery (Figure 8.36). The graves were marked by small stone mounds between 2m and 3m in length, although some only survived as circular mounds. Most of the graves were aligned NW\SE and those that appear to be on different orientations may be so because of differences in preservation rather than burial practice. Many of the graves appeared to have been marked with headstones. Given the number of burials surveyed and the total area of the cemetery it was calculated that in excess of 650 burials may be interred in this cemetery.

The remains of three three-sided walled structures were located on a rise in the centre of the cemetery. These measured 5m by 3m. Two were orientated NW\SE whilst the third was constructed on an E\W alignment. These structures may have been built around the graves of those that for some reason deserved more elaborate grave markings.

### 8.8.2 Northern Cemetery

The cemetery located to the north of the study area was previously identified and a wall has been built around it that encloses an area of 1.9ha. Two small areas of graves were located in the eastern corner of this walled enclosure. The graves were of a similar form to those in the southern cemetery, although no large tombs were observed. Judging by the size of the cemetery it was estimated that about 100 graves were present.

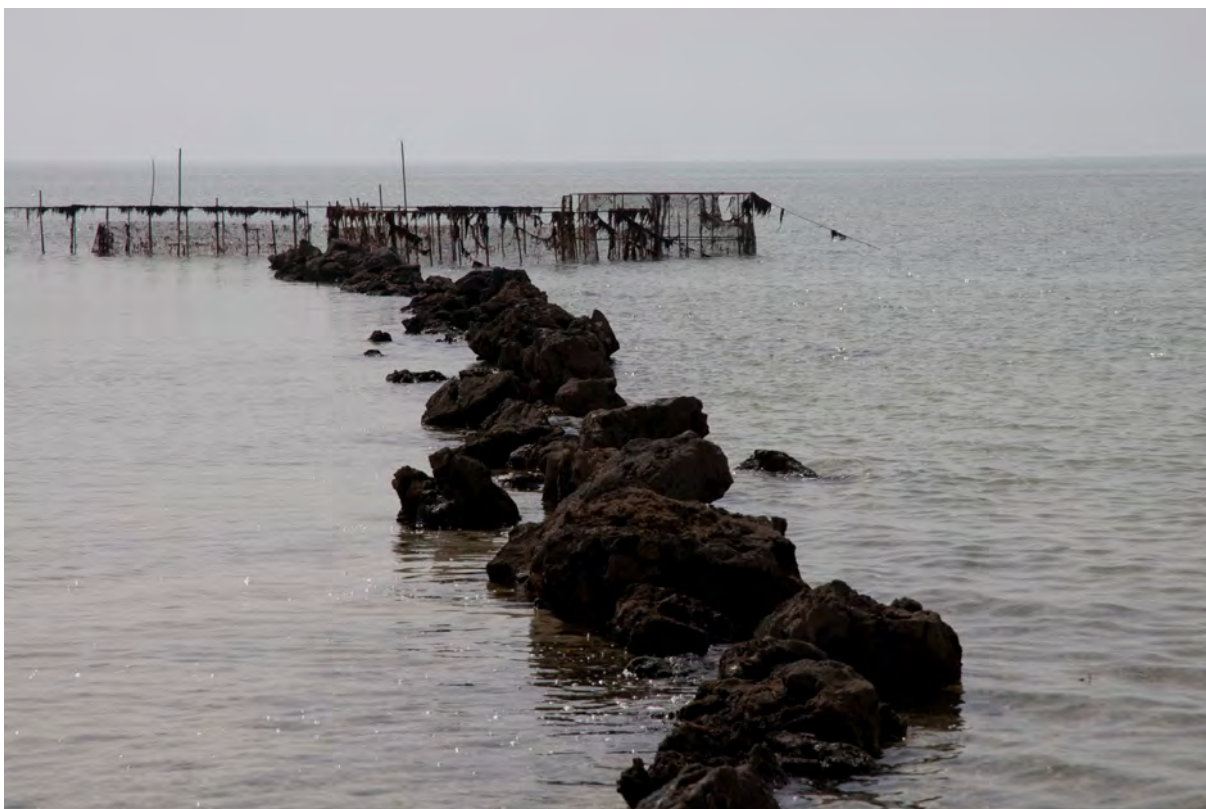
## 8.9 Fishtraps

The shallow bay around which the settlement is located has been extensively exploited by people using inter-tidal fish traps in the shallow bay. The fishtraps survive in many different forms with some just visible below the sand as stone lines, and others standing as linear or curvilinear stone mounds up to 0.5m in height.

Many of the traps were constructed from large natural limestone rocks placed close together one or two courses high (Figure 8.37). The linear alignments of rocks appeared to relate to the curvilinear traps and may have been somewhere where nets were attached. The curvilinear fishtraps often included gaps of c.1.5m in their course.

An elaborated curvilinear fishtrap was identified 40m to the west of the area of well preserved buildings. Its northern terminus was roughly aligned with the northern end of the linear midden bank whilst that to the south was located 70m to the west of FREP01. This trap measured 240m from north to south and consisted of three adjoining curvilinear stone banks. Stone mounds measuring between 3m and 3.5m in length were located c.25m apart on the land side (Figure 8.38). These mounds were perpendicular to the main bank often with a gap of 2.5m or more between the two features.





**Figure 8.37:** Fishtraps to the north. Modern fenced fish traps seen in the background.



**Figure 8.38:** People using the fishtraps at Furayhah.

Other than the tentative relationship that these fishtraps have with the surviving terrestrial remains there was no evidence for their date of construction. It is possible that they may be datable by their form and construction technique. Although dating these structures archaeologically is difficult, written evidence suggests that they may be contemporary with the occupation at Furayhah.

## **8.10 Other Features**

### **8.10.1 Well**

Located 70m south of Jebel Furayhah a well in excess of 3m in depth was identified. This was the only well located within the study area or identified by the Regional Survey team in the vicinity of the settlement (see also Section 9). The well was walled around the north, south and western edges. The wall was constructed from limestone blocks, similar to the other buildings on the site. The eastern edge was comprised of a steep slope which may have provided access into the well for people and animals. Upcast from the well was located 8m to the west and was comprised of a mound of natural material 15m in diameter. A modern concrete cistern footing is located to the north east of the well, which may have held a replacement water source for this area when fresh water was low or had run out.

### **8.10.2 Beach Clearance**

Several large areas in the vicinity of Furayhah are covered with material deposited during modern beach cleaning. One of these was located in the study area to the north of the southern cemetery. Others around Furayhah were recorded by the Regional Survey (see Section 9).

### **8.10.3 Excavation**

A 20m by 20m archaeological excavation trench was located 45m to the south of Qal'at Furayhah. This trench was left open after the 2005 excavations of the domestic buildings around the fort. A spoil heap associated with this excavation was located directly to the west.

Spoil heaps comprising material excavated from Qal'at Furayhah, also in 2005, were located to the north and west of the fort.

### **8.10.4 Bulldozing**

Only two well preserved buildings were located to the far north of the study area. Two large areas, both bounded to the east by middens, contained the remains of no buildings. In one area to the south west of the northern cemetery wall an area of hardcore had been laid that would obscure any remains. To the north of this building-rubble with linear bulldozing marks attest to the partial demolition of some buildings in this area.

## 8.11 Interpretation and Discussion

Survey and excavations at the site of Furayhah have identified and uncovered the remains of an extensive settlement. Although building form and construction techniques appeared to have been relatively uniform across the site it was apparent that preservation varied considerably across the area. These areas between which preservation differed were demarcated primarily by the location of middens.

The number of middens are themselves an indicator of the longevity of occupation on this site. The size of individual middens, particularly the linear bank midden and those associated with the eastern buildings may be an indicator of the morphology of the settlement. Those middens to the east were considerably larger and more eroded than those elsewhere on the site, perhaps indicating that these were associated with an early phase of settlement. Fragmentary building remains, surveyed up to 375m inland from the coast, may indicate that this early settlement was the most extensive, but that it was abandoned at some point in favour of those buildings directly adjacent to the sea. Excavations in FREP03 demonstrated that this phase of settlement was not short lived, but survived through several abandonment, re-use and reconstruction events.

The presence of middens such as that excavated in FREP02 and that located over building remains to the south of Qal'at Furayhah indicate that buildings were used, reused and reconstructed on all areas of the site. The buildings to the south of the linear midden were centred around Qal'at Furayhah and the mosque (FREP01). The earlier structure located under the remains of Qal'at Furayhah, which may represent a previous mosque, may indicate that the plan of this area of the settlement was significantly modified during the final phases of occupation. The mosque (FREP01) itself appears to have gone through at least two phases of refurbishment, which are as yet undated. Multiple lines of columns and arches identified in this mosque suggest that it was once a grand and elaborate structure. The preservation and depth of the remains to the south of the linear midden are indicative of multi-phased occupation. It would be interesting to investigate the relationship of the Qal'at to the surrounding buildings in the future to establish whether it was a much later structure established on and overlying significant buildings of an earlier phase of settlement. If this was the case it may represent a change in hierarchy or the ruling family of this settlement, who imposed new structures on those of the old order. This is supported by presence of two cemeteries. The larger cemetery to the south possibly associated with the larger and more extensive settlement that included the buildings to the north and east, and the cemetery to the north associate with the more focused settlement to the south around Qal'at Furayhah.



## 9. Regional Survey Report

*David Mackie*

### 9.1 Introduction

Between December 2009 and March 2010 a regional survey was undertaken to the north and east of Al Zubārah. The aim was to launch an intensive field walking of the area recording sites of all ages and types to create a record of human occupation and thereby to characterize the hinterland of Al Zubārah. Previous surveys by the Birmingham Archaeology Unit using aerial and satellite imagery have recorded sites within survey area, which were also visited and their records updated and corroborated by in-field observations.

By the end of the season an area extending 8km north of Al Zubārah fort and 4.5km inland to the east from the coast had been surveyed. A total of 161 transects were completed and 95 new sites recorded. In addition, 57 sites previously recorded by Birmingham Archaeology Unit were checked on the ground (Figure 9.1).

This report will broadly describe the types of site recorded from the regional survey and the types of site previously recorded by Birmingham Archaeology Unit. Not all of the sites are described and there is a catalogue that lists all site numbers, site type and a brief description (see Appendix X). Although the sites have been broadly split into types some of the sites contain more than one type. Some of the sites are ambiguous in their nature and may require further investigation.

Sites numbers recorded during this season all have the prefix QIAH while those previously recorded have the prefix QNMR. The survey methodology is described in detail in section 4.4.

### 9.2 Newly identified sites

#### 9.2.1 Temporary camps

Temporary camps made up the majority of the sites recorded during the survey, numbering 54 out of a total of 95 (56%). These sites are situated either on the rocky desert or close to the edge of a flat area, or within a flat area. They are characterised by having between one and four, or sometimes more rectangular or square areas which represent tent clearances. These areas were defined either by low stone banks formed from the cleared material, alignments of stones placed around the edges of the tent position, or sand and shell spreads which define both internal and external areas. The arrangement and size of these temporary camps sites varied from site to site. Site QIAH 2033 had three tent positions arranged in a line (Figure 9.2), while site QIAH 2088 (Figure 9.3) had three set within a cleared area. The majority of the sites were defined by single or double positions, or had no apparent layout. The sizes of the tent positions range from 4m x 4m, 6m x 4m, and 7m x 6m up to 12m x 4m.

A number of sites had additional, associated features with them. Some but not all sites had clearance cairns forming small clusters, elongated piles, and singular dumps marking a high point or defining





**Figure 9.2:** Site QIAH 2033, general shot of three tent positions



**Figure 9.3:** Site QIAH 2088, general shot of cleared area with tent positions



the edge of the site. Five of the sites have a number of small cairns surrounding the central tent position, which may mark the location for the guy ropes of the tent.

Another feature recorded was comprised of an alignment of stones with a semi circular niche half way along its length, with a cleared area behind. Usually these were located a short distance away from the main site and were orientated towards the southwest and may represent a prayer area. Five sites QIAH 2003, QIAH 2005, QIAH 2013, QIAH 2042 and site M15 had these features, however, they also occurred randomly within the desert with no other features associated with them.

Only one site (QIAH 2042) had a small collapsed stone walled structure next to the tent position.

Three sites (QIAH 2040, QIAH 2049 & QIAH 2050) had an additional animal enclosure. These were large partially cleared areas defined by stone banks or a regular spread of animal manure (Figure 9.4). Internal divisions could be seen where former fence lines had been removed.

### **9.2.2 Cemetery sites**

Al Zubārah cemetery (QIAH 2002) is situated 400m to the east of the outer town wall and north of the northern screening wall. The site measures 718m x 526m and is situated on the higher ground formed by the old beach line, which forms the natural boundary of the site. The majority of the burials have no visible cairn or marker but the burial cuts can sometimes be seen as subtle colour changes in the sand. A few small clusters of graves still have head or foot markers. The largest cluster of graves marked with cairns with a head and foot marker, are situated on a raised area close to the city wall and may represent a later phase of use. The cemetery has been partially impacted by vehicles driving across the site, as suggested by various tire tracks. This has contributed significantly to the obliteration of grave markers.

To the north of the former settlement site QIAH 2000 is a cemetery site QIAH 2001 that may be associated with it. Burials are defined by low oval cairns with a head and foot marker stone. The majority of the graves are in good condition however within the northern area of the site the graves are less well defined. The site measures 224m x 90m and is bounded by modern tracks (Figure 9.5).

The former settlement at Al Furayhah has two large cemeteries (see also Section 8). To the north of the settlement a cemetery site QIAH 2054 is enclosed by a substantial trapezoidal shaped wall that measures 180m x 149m, constructed from cemented limestone blocks with an entrance on its northern side. The majority of the visible graves form a cluster along the eastern wall and are defined by cairns with head and foot markers.

The other cemetery site (QIAH 2055) measures 259m x 73m and is situated to the south of Al Furayhah and west of the rock outcrop of Gebel Freha. The condition of the graves varies with the majority being marked with a cairn and head and foot markers. An attempt has been made to construct a limestone block wall similar to the cemetery site QIAH 2054 to the north but has not been completed.



**Figure 9.4:** Site QIAH 2049, stock enclosure defined by cleared area covered with manure



**Figure 9.5:** Site QIAH 2001, cemetery

### 9.2.3 Grave clusters

These sites are ambiguous in nature, with some of the cairns resembling graves with markers, others less so. The sites do not have a clear boundary although one appeared to have marker cairns.

Site QIAH 2037 comprises 30 possible graves and is defined by linear or oval cairns within an area that measures 16m x 15m. Some of the cairns appear to have head and foot markers and they are all aligned NW-SE. The site is situated on the edge of a flat area and has no boundary apart from three small marker cairns.

Site QIAH 2043 comprises seven possible graves situated on a flat area within the desert. All are aligned NW-SE and have linear or oval cairns, two of which have a marker stone.

Site QIAH 2061 comprises a cluster of 40 possible graves within an area measuring 34m x 25m. They all appear to be aligned NW-SE defined by linear and oval cairns with no clear head or foot marker stones visible. The site is situated on the edge of a flat area and has no other boundary surrounding the cluster.

Site QIAH 2073 comprises a cluster of 30 possible graves within an area measuring 44m x 32m. The possible graves are marked by loose linear cairns some of which if not all could be geological in origin (Figure 9.6).

### 9.2.4 Settlements

Site QIAH 2000 is situated at the base of the scarp slope 400m west of Al Zubārah fort, to the north of the northern screening wall running from Al Zubārah town to Qal'at Murayr. The site is to the north west of Qal'at Murayr and it is unclear whether it formed part of that settlement or date to a later or earlier period. The road leading to the Ras Ushayriq peninsula may have truncated a segment of this settlement.

The site is comprised of one clearly defined compound on the western edge close to the sabkha with another possible compound to the south close to the screening wall. Other structures consist of five collapsed stone structures comprised of one to three rooms to the east of the compounds. The extent of the site measures 367m x 287m. Within and to the north and east of the settlement are nine irregularly shaped bulldozer cuts. The northern machine cut scar has been recorded as QNMR10318 (Figure 9.7).

### 9.2.5 Structural features

Site QIAH 2059 is situated to the southeast of the abandoned village of Ain Mohammad on the edge of a flat area. It is comprised of 11 regular stone features within an area that measures 173m x 168m. Only two of these features have clearly defined collapsed walls and both are close to a sub circular depression that could be an old well site. The largest structure measures 6m x 3m and the other is 5m x 3m. Between these structures is an area defined by a stone alignment that measures 6m x 4m and this could be a temporary camp position. The remaining eight features are smaller in size and do not have any clearly defined wall lines. The largest measures 4.5m x 2.5m while others measure 3m x





**Figure 9.6:** Site QIAH 2061, possible grave cluster



**Figure 9.7:** Site QIAH 2000, collapsed structure within settlement

3m and the smallest measures 2.5m x 2.5m. It is possible that some of these features are natural in origin.

Site QIAH 2067 is comprised of two possible collapsed stone structures that are probably part of site QNMR 10244. The larger feature measures 18m x 12m and the smaller feature measures 4m x 4m. No clearly defined wall lines could be seen within these features.

Site QIAH 2072 is comprised of a series of slightly raised sub square, circular and angled, possible collapsed structures. They are aligned NW-SE and are within an area that measures 126m x 47m. There are no clearly defined wall lines and it is possible that these are geological features.

Site QIAH 2074 is comprised of a series of slightly raised sub-square, circular and angled, possible collapsed structures. They are aligned NW-SE and are within an area that measures 126m x 47m. There are no clearly defined wall lines and it is possible that these are geological features.

Site QIAH 2078 is similar to site QIAH 2074 being defined by regular raised areas of stone, square and rectangular in shape that could be collapsed structures. The main site is aligned NE-SW and covers an area measuring 76m x 56m with a further possible group of four structures 120m to the southwest. There are no clearly definable wall lines and the area is scattered with moderate amounts of pottery and shell fragments.

Site QIAH 2086 is comprised of three clusters of collapsed stone structures situated on the slightly higher ground next to a flat area or wadi. The buildings are spread over an area measuring 110m x 104m and are comprised of two to three small rectangular and square buildings that measure 4m x 2m or 3m x 2.5m. Some appear to be joined while others have a small extension, all have remnants of small enclosure walls. One other single structure lies between all of the buildings and measures 3m x 2m. The walls are clearly defined being 0.40m wide and surviving up to a height of 0.40m (Figure 9.8)

## **9.2.6 Wells**

Site QIAH 2036 is comprised of a stone enclosure wall 0.40m wide and one course high that measures 136m x 118m and is situated within a flat area. At the centre is a well 0.73m in diameter, capped with a stone and cement square structure 2m x 2m and lined with stone rendered in concrete. The water level is -3.62m from the top of the well.

Site QIAH 2056 is comprised of a square-shaped, disused well measuring 2.15m x 2.15m with the upper part rendered with cement (Figure 9.9). The well has no lining and is 3.20m in depth. The well has an additional stone built rectangular trough rendered in cement on the east side of the well that measures 3.80m x 3m. The remains of two linear spoil heaps are visible on the northern and southern side of the feature. The site is situated to the south of Ain Mohammed and close to site QIAH 2057 and QIAH 2058.

Site QIAH 2057 is comprised of a disused collapsed stone lined well measuring 8m x 6m and is 2.60m deep. Fragments of a broken cement trough and eroded spoil heap are visible on the southern side. To the southeast are the remains of a small stone walled enclosure that measures 20m x 14m that survives up to 0.80m in height and is 0.50m thick.



**Figure 9.8:** Site QIAH 2059, collapsed structures to southeast of Ain Mohammed.



**Figure 9.9:** Site QIAH 2056, partially rendered unlined well with cistern



Site QIAH 2058 is a rectangular stone and cement rendered capping to a well measuring 6m x 6.5m and 1.04m thick. The well shaft measures 2.90m x 2m and is 4.25m in depth (to the top of the water level). The eroded spoil heap is still visible around the well.

Site QIAH 2064 is comprised of a sub circular stone lined well 4.10m in diameter and 3.70m in depth (top of the water level). It is situated on the edge of a flat area and there is a temporary camp with three cleared areas defined by stone alignments to the northwest. The largest area measures 4.60m x 4.20m and has a sand spread. The other two areas measure 4.40m x 4.40m and 4.40m x 3.30m.

Site QIAH 2066 is comprised of a large sub square enclosure that measures 68m x 53m defined by a 0.50m wide collapsed wall constructed from stone. On the north western side of this enclosure is a smaller trapezoidal enclosure that measures 43m x 23m. At the centre of the large enclosure is a large circular cut 14m across with an additional water worn channel leading in from the northwest. The cut is not lined and appears to be a well. To the south just outside the enclosure is another circular shallow cut with a linear channel measuring 18m x 10m. This feature may also be a well. The site is situated on a flat area to the west of a modern farm compound and has four temporary camp positions to the north west on the edge of the flat area.

Site QIAH 2092 is a circular stone lined well 4.40m in diameter and 5m in depth (to the top of the water level). An eroded spoil heap 20m in diameter surrounds the well. Two cement troughs remain intact on the eastern side and the remains of a stone enclosure measuring 39m x 28m can be seen to the southeast.

Site QIAH 2094 is a disused partially collapsed square stone lined well measuring 5.20m x 5m surrounded by an eroded spoil heap measuring 30m x 22m. The depth of the well is 3.40m to top of the infill.

Three other possible well sites were recorded. They are comprised of a spoil heap surrounding a sub circular depression. Some have an additional water eroded channel leading into them through a break in the spoil heap. There is no evidence for a lining and the depth of the depression can be up to 0.60m.

Site QIAH 2011 is defined by a sub circular eroded spoil heap that measures 25m x 23m and is 0.60m high enclosing a sub circular area 8m in diameter. The site is situated on a flat area to the east of the rock outcrop of Gebel Freha (Site M15). It has previously been recorded as part of a series of machine dug U shaped earthworks site QNMR 10234 that have been constructed against or close to the rock outcrop (see below).

Site QIAH 2021 is comprised of a sub circular eroded spoil heap that measures 17m x 15m with an opening on its northern side, surrounding a circular depression c.8m in diameter (Figure 9.10). It is located on the edge of a flat area and has 3 to 4 eroded bulldozer scars or agricultural strips to the southwest. There are also more recent areas of bulldozer activity to the west and an area of parallel strips to the south. It is unclear what this feature is, but it is possible that it is associated with water management or a shallow well.

Site QIAH 2044 is a possible disused well defined by an eroded sub circular spoil heap measuring 10m x 9m. The central unlined irregular depression measures 7m x 4.60m and is 0.60m in depth. The site is situated within a flat area and is close to sites QIAH 2041, QIAH 2042 and QIAH 2043.



**Figure 9.10:** Site QIAH 2021, possible disused well



**Figure 9.11:** Site QIAH 2069, dumps of rock with other general rubbish

Similar features were recorded on site QIAH 2059, QIAH 2066, QIAH 2073 and within the abandoned settlement of Ain Mohammed.

### **9.2.7 Dumps**

In general small dumps of concrete, stone and general rubbish were noted while walking transects. Two large dumps of material were recorded, site QIAH 2065 measured 62m x 34m and site QIAH 2069 measured 60m x 30m. These were comprised of rock dumps mixed with general rubbish. Site QIAH 2065 had evidence of bulldozer activity (Figure 9.11).

### **9.2.8 Enclosures**

The enclosures recorded during the regional survey varied in size and construction techniques. Site QIAH 2060 is comprised of a small sub circular enclosure defined by a low bank of stones 0.70m in wide and measures 19m x 15m. The enclosure is situated on the edge of a flat area and has an entrance or gap on its northern and southern side. There is no clearly defined wall line visible within the stone bank and it is possible that this is a natural feature (Figure 9.12).

Another small sub rectangular earthwork enclosure was constructed against the boundary bank of site QIAH 2025. The enclosure measures 26m x 22m and is bounded by a bank 2.30m wide and 0.80m high. The bank has been breached in three places and the interior of the enclosure is full of modern rubbish.

The well site QIAH 2057 had a small stone walled enclosure to the southeast. Two other well sites QIAH 2036 and QIAH 2066 were surrounded by a stone walled enclosure.

### **9.2.9 Boundaries**

Site QIAH 2025 is comprised of a linear bank that starts at the coast and runs east for c.470m before curving round to the north for c.740m to meet the road that leads to the villa on the coast south of Al Furayhah. The earthwork continues on the other side of the road to curve round for another c.470m ending at the rock outcrop of Gebel Freha. This low bank has been constructed by machining material from one side which varies in width from 11m up to 15m and has numerous machine scars along the outside of the feature. It seems probable that this feature forms the southern boundary for the villa, although it might also be a track? Roughly half way along this feature is a small sub rectangular earthwork enclosure that has been constructed against the boundary bank (Figure 9.13).

### **9.2.10 Cleared areas**

Only one site QIAH 2035 was recorded during the survey. It comprised of a sub rectangular cleared area measuring 16m x 13m defined by a low bank of stones, situated on a high point within the desert. An elongated clearance cairn 4.80m x 2.5m is situated 12m to the west of this area (Figure 9.14)





**Figure 9.12:** Site QIAH 2060, possible enclosure



**Figure 9.13:** Site QIAH 2025, possible boundary or track





**Figure 9.14:** Site QIAH 2035, cleared area



**Figure 9.15:** Site QIAH 2030, six elongated and two round cairns, possibly natural

### 9.2.11 Cairns

Only one site QIAH 2030 was recorded during the survey. This site measures 47m x 13m and is comprised of six elongated cairns, which vary in length from 1.20m up to 3.30m and in width from 0.80m up to 1.20m. There are also two sub circular cairns which measure 1.60m x 2.25m and 1.70m x 1.60m. It is quite possible that these are natural features. The site is situated on higher ground close to the edge of flat area.

Small cairns were noted everywhere in the desert marking high points, tracks, survey points, hazards and many of the temporary camps had clearance cairns (Figure 9.15)

### 9.2.12 Salt extraction

Site QIAH 2008 is situated in a low, sub-circular area of *sabkha* measuring 188m x 185m east of the Al Zubārah town wall and west of the town cemetery site QIAH 2002. There are at least 100 sub circular cuts randomly dug across the area ranging in size from 0.90m up to 1.90m in diameter. Some still have remnants of a spoil heap around the cut as well as the salt crust that would have been harvested from them (Figure 9.16).

### 9.2.13 Hides

At first these sites of which three were recorded were thought to have a military function. Two sites QIAH 2015 and QIAH 2032 were situated on higher ground and one QIAH 2031 was situated on an old raised beach line within the sabkha close to the coast. The main feature was a dug out constructed from concrete blocks with a plywood and plastic sheeting roof covered with soil in an attempt to camouflage it. The entrance stood proud of the surrounding surface and was made from a wire frame covered with material that was plastered and painted to blend in to the scenery. The best-preserved example had spy holes all around the entrance with additional openings for rope or line to pass through. Two of the sites had additional linear concrete features around the hide. It was only after looking at the Directory guide to birds in Qatar by Tawfeeq Yousof AL-Qaisi that contained photographs of these features that are called *koakha* (hiding place) or *estraha* (rest place). These were used in the trapping of birds of prey (falcons) using a live pigeon as bait and nets (Figure 9.17).

### 9.2.14 Bulldozer/machine cuts

These features are very common within the survey area and are clearly visible on aerial or satellite imagery. They occur either as well defined area of parallel linear strips or as random linear cuts that criss-cross the desert on both sides of the Al Shamal road (Figure 9.18). Single irregular shallow cuts and scars with a spoil mound at the centre or at the end of the cut were noted across the survey area. Other areas of the desert look like they have been quarried and former construction camps have been demolished and levelled.





**Figure 9.16:** Site QIAH 2008, salt extraction pits



**Figure 9.17:** Site QIAH 2031, hide (koahka) used to trap birds of prey



**Figure 9.18:** An area of bulldozer cuts by the Al Shamal road



**Figure 9.19:** Site QNMR 10189, collapsed stone enclosure with modern temporary camp



All the earthwork features previously recorded by the University of Birmingham have been constructed with bulldozers or machines and some of the sites recorded are just areas of bulldozer activity (Figure 9.18).

### **9.3 Sites previously recorded**

The next section describes sites previously recorded by the University of Birmingham using aerial and satellite imagery. The sites have been broadly split into similar categories as the regional survey sites. Some sites recorded as one type had to be changed after checking on the ground. In other cases the present record supplements the existing data.

#### **9.3.1 Enclosures**

These enclosures varied in size and construction techniques as those on the regional survey. Site QNMR 10189 is comprised of four irregular shaped stone walled enclosures situated within or close to the edge of a flat area. The three largest enclosures measure 73m x 39m, 53m x 32m and 54m x 34m. The smallest sub circular enclosure measures 25m x 23m. All comprise a collapsed wall 0.46m wide sometimes surviving to a height of 0.30m with no evidence for an entrance in any of the enclosures. To the south of the largest enclosure is a sub circular shallow depression approximately 2m in diameter surrounded by an eroded spoil heap 18m across. This was similar to those recorded during the regional survey and it may be a possible well. On the eastern edge of the flat area is a spoil heap measuring 36m x 15m (Figure 9.19).

The remaining two enclosures checked on the ground were larger and enclosed large areas of desert.

Site QNMR 10195 is a sub circular enclosure comprised of an earthwork that measures 443m x 439m. The enclosure bank is 5m wide and 0.70m in height. The bank has been constructed by machining material from one side to form the bank which has left scars all around the outer edge of the enclosure. There are a number of breaks in the earthwork and it is crossed by vehicle tracks (Figure 9.20).

Site QNMR 10198 is a large irregular shaped enclosure comprises an earthwork that measures 990m x 603m. The enclosure bank is 3m wide and 0.70m in height and has been constructed in the same way as site QNMR 10195. The interior of the enclosure was sub-divided into three areas by additional banks. The northern part has a number of breaks in the earthwork and vehicle tracks cross the enclosures.

#### **9.3.2 Beach clearance**

As a result of oil spillage during the early 1990's the coastline has been covered in oil and these dumps are the result of clearing the beaches. They are found all along the coastline, on areas of sabkha and some are found inland. They occur within the walls of Al Zubārah and there are dumps at Al





**Figure 9.20:** Site QNMR 10195, earthwork enclosure showing bulldozer scars on the right of the bank



**Figure 9.21:** Site QNMR 10139, individual dumps of beach clearance and rock



**Figure 9.22:** Site QNMR 10140, large area of beach clearance partly enclosed by a sand bank



**Figure 9.23:** Site QNMR 10322, cemetery enclosed by a limestone block wall

Furayhah and along the western base of Gebel Freha. They are easily identified by the colour of the white beach sand that also contains bitumen. These can occur as a single dump, spreads, a scattered group or a large area of dumps contained within a bank. These larger sites also contain other dumps of general rubbish or stone.

Site QNMR 10233 is the same as QIAH 2009. This site is situated on the coast and had previously been recorded as an area of agriculture defined by interlocking earthworks. Within these interlocking earthworks are numerous dumps of beach clearance and other dumps of general rubbish.

Site QNMR 10138, QNMR 10139, QNMR 10140 and QNMR 10141 are all described as possible cairns. They are all comprised of clusters of or enclosed areas of beach clearance and stone dumps as well as other general rubbish (Figure 9.21 & 9.22).

No other site numbers were allocated to these sites because of the frequency of them along the coast, they can be clearly defined on the satellite imagery.

### **9.3.3 Cemeteries**

Sites QNMR 10190 and 10191 are situated to the north of the abandoned settlement of Ain Mohamed (QNMR 10192). Both consist of burials marked by cairns with a head and foot marker. An earthwork bank has been constructed around them that in turn has been enclosed with a cement block wall with a single entrance on one side. Site QNMR 10190 measures 60m x 36m and site QNMR 10191 measures 64m x 34m.

Site QNMR 10322 is a large cemetery enclosed by a limestone block wall in the same style as the one enclosing site QIAH 2054 (Figure 9.23).

### **9.3.4 Grave cluster**

This site is described as an animal enclosure situated on the coastline above the high water mark (Figure 9.24). Site is however a grave cluster that QNMR 10117 comprises seven burials defined by cairns with head and foot markers. The position of the burials has been marked by stones placed around the area, which have been enclosed by a later earthwork bank measuring 41m x 30m. This site was situated on a small peninsula to the north of Al Furayhah. To the south of these burials there were some remnants of wall lines, which have been partially covered by a large area of beach clearance.

### **9.3.5 Earthworks**

There were eight sites previously recorded that were defined by earthworks which had all been constructed with bulldozers or machines. Three of the sites, QNMR 10234, QNMR 10235 and QNMR 10142 were comprised of three or four U shaped earthworks. The largest earthwork measured 43m x 24m and 3m high and the smallest 18m x 11m and 2m high. Four of the earthworks had an additional





**Figure 10.24:** Site QNMR 10117, grave cluster enclosed with an earthwork bank



**Figure 10.25:** Site QNMR 10142, four u shaped earthworks

linear bank behind the open end. These sites also contained remnants of temporary camp positions and bulldozer scars. Two earthworks from site QNMR 10234 had been constructed against the sides of the natural rock outcrop of Gebel Freha (site M15) as possible additional cover or camouflage. In shape and appearance these features look like they may have had a military function. They could have acted as blast walls or be used to conceal military positions, however they could have also had a more benign use (Figure 9.25).

A linear earthwork constructed across a flat area or wadi to form a barrier defined two sites. The western site QNMR 10308 is 144m x 18m wide and 1.70m high. To the east of this site QNMR 10309 is 317m x 18m wide and 1.70m high. Both have additional small linear earthworks extensions at either end of the feature (Figure 9.26).

Site QNMR 10307 is constructed in a similar way and is situated on the eastern side of a flat area to the south. It is 266m x 21 and 1.70m high. As well as having small linear earthworks extensions at either end this site has two additional earthworks half way along its length.

Site QNMR 10193 is a large regular spoil heap measuring 15m x 7m and 3m high. It is situated close to site north of site QNMR 10194 and west of QNMR 10142. There is another similar earthwork measuring c.28mx c17m to the north of a rock outcrop QNMR 10188.

Site QNMR 10194 is a large irregular spoil heap measuring 25m x 30m and 2.80m high situated to the south of site QNMR 10193.

### **9.3.6 Wells**

Site QNMR 10182 is a square stone lined well that has partially collapsed on its eastern side (Figure 9.27). It measures 5m x 5m and is 2.20m in depth. To the northeast a later concrete block, cement lined cistern was built. It measures 5.60m x 4.12m. To the south of these features is an irregular shaped flat area that measures 39m x 31m with a shallow depression at the southern end. On the northwest side of this area is a sand and shell spread that measures 19m x 11m. There are scatters of pottery, glass, plastic and other general rubbish around the western side of the flat area [Figure 27].

Site QNMR 10183 is situated to the east of QNMR 10182 and is comprised of a large depression measuring 8m x 15m and 1m in depth surrounded by an eroded spoil heap that has a gap on its north west side. Two additional shallow channels, probably eroded by water, lead into the depression through this gap. The whole feature measures 28m x 23m and does not appear to have a stone lining. It is situated on the side of a flat area and might be a well or does it act as a sump collecting water from the area.

Site QNMR 10323 is a disused stone lined square well that measures 4m x 4m and is 2.40m in depth (top of the infill). The well is surrounded by a large spoil heap 22m x 24m and is situated to the east of well QIAH 2092 within a flat area.

Site QNMR 10324 is situated to the north of QNMR 10323 on the same flat area and is comprised of three possible well sites defined by a sub circular depression surrounded by an eroded spoil heap. The smallest of the three is very hard to see on the ground. There is a very subtle depression 8m





**Figure 9.26:** Site QNMR 10308, linear wadi barrier



**Figure 9.27:** Site QNMR 10182, stone lined well and cistern





**Figure 9.28:** Site QNMR 10324, possible well



**Figure 9.29:** Site QNMR 10327, unlined well





**Figure 9.30:** Site QNMR 10320, fort looking west across the tower into the compound



**Figure 9.31:** Site QNMR 10320, fort looking west across the tower into the compound

across surrounded by a lighter coloured area that could be the remnants of a spoil heap that has a gap within it on the northwest side. The whole feature measures 22m x 14m.

The largest feature including its sub circular spoil heap measures 56m x 36m with a central depression measuring 16m x 15m and is 1.20m in depth. This has an additional water eroded channel leading into the depression on the northern side of the feature.

The third feature measures 26m x 22m including its surrounding spoil heap and its central depression measures 12m x 8m and is 0.70m in depth. This has an additional water eroded channel leading into the depression on the northern side (Figure 9.28).

Site QNMR 10327 is a large unlined well 7.34m across and 3.80m in depth (top of infill), surrounded by a 1m high spoil heap that measures 24m x 23m. The well is situated within an flat area and 40m to the west there is another sub circular depression 4m across surrounded by a spoil heap measuring 12m x 13m with a gap on the west side (Figure 9.29).

### **9.3.7 Forts**

Site QNMR 10181 is the largest structure within the abandoned settlement of Al Furayhah. It measures 42m x 42m and has previously been partly excavated and not backfilled or protected. The external wall is 1.5m wide and survives to a height of 1.20m with a small round tower on the southwest corner (see Section 8). Other towers may survive under the rubble spreads on the southeast and northeast corners. There is one entrance centrally located on the northwest side of the compound. The internal side of the northwest wall has a range of buildings built along its length. One of the buildings has the remnants of a date press within it.

Site QNMR 10320 is a ruined square structural feature that measures 20m x 20m situated on a high point within a flat area or wadi. The collapsed compound wall is 0.60m wide and has an entrance on the southeast side, with a round tower on the northeast corner. Within the compound there are a range of buildings along the northwest side and two small ones on the southwest wall. The southwest rectangular building still has surviving mud brick built on top of the walls, which survive up to a height of 1.30m. The internal wall plaster lines are visible within the collapsed material (Figure 9.30).

### **9.3.8 Settlements**

Site QNMR 10192 is the abandoned settlement of Ain Mohammed and comprises at least 24 derelict and partially collapsed structures that may relate to different periods. The main focus of the settlement is a rectangular walled enclosure surrounding a disused well that still retains its pump and concrete lined cisterns and troughs. There is a smaller enclosure on the southern side that has been used for agriculture and an enclosure on the northern side defined by alignments of stones. To the east of this enclosure is a large sub-circular cut that may be a possible well. The majority of the derelict and collapsed buildings are situated to the northwest with a small group on the eastern side of the well enclosure. They are built in the vernacular style and use traditional and modern building construction techniques (Figures 9.31-9.33). Both cemetery sites QNMR 10190 and QNMR 10191 are situated to



the north of the settlement. To the southeast of the settlement on a flat area are three well sites QIAH 2056, QIAH 2057 and QIAH 2058. There are also circular depressions with eroded spoil heaps that may be wells. There are collapsed structures site QIAH 2059 scattered around the southeast edge of the flat area. Within the settlement are two collapsed structures, one square and the other rectangular with a tower on one corner that could be forts.

Site QNMR 10239 is situated to the southwest of Ain Mohammed and measures 146m x 96m and is aligned NE-SW. The site is made up of rectangular and square collapsed stone structures some of which have enclosures or compounds. There is one standing building on the northwest of the site constructed from stone that has been rendered. It has a small stone built cement rendered cistern on its southern side. The style of building is similar to those at Ain Mohammed and may be that it relates to a phase of the settlement (Figure 9.34).

Site QNMR 10325 is a former settlement comprised of a series of small rectangular collapsed stone structures aligned SW-NE situated on the east side of a flat area or wadi. The walls are 0.40m thick and survive to a height of 0.50m. The site is close to the well sites QIAH 10323, QNMR 10324, QIAH 2092 and QIAH 2094 (Figure 9.35).



**Figure 9.32:** Site QNMR 10192, collapsed structure or possible fort with the well enclosure behind



**Figure 9.33:** Site QNMR 10192, general view of the types of standing buildings



**Figure 9.34:** Site QNMR 10239, general view across collapsed structures





**Figure 9.35:** Site QNMR 10325, collapsed structure within the site



**Figure 9.36:** Site QNMR 10244, possible grave cairns and collapsed structures within settlement



### 9.3.9 Structural features

Site QNMR 10179 is a square collapsed structural feature that measures 10m x 10m. It comprises stone built walls 0.40m wide and is situated on the shoreline just above the high tide line. There appears to be an entrance on the northern side with another wall running from the northeast corner north before returning west. The structure is part of the abandoned settlement of Al Furayhah.

Site QNMR 10240 appears as two raised areas of stone, roughly square in shape situated to the southeast of QNMR 10239. The smaller area measures 7m x 6m and the larger area 9m x 10m with a 4m gap between them. There are no discernable wall lines within these raised stone areas, suggesting this is a natural feature.

Site QNMR 10241 has been described as a partially ruined abandoned structure. It is a natural area of silt, lighter in colour to its surroundings. The scrub within this area may have been misconstrued as a structure.

Site QNMR 10244 is a possible cluster of ruined structures roughly aligned E-W along a slight ridge. Some of the features appear regular and square in shape while others are more ephemeral. There appears to be a possible cluster of burials marked by cairns roughly aligned NW-SE on the southern side of the site. Site QIAH 2067 forms part of the eastern end of this site (Figure 9.36).

Site QNMR 10321 is comprised of three collapsed rectangular structures around QNMR 10320. The largest measures 7m x 3.30m (Figure 9.37).

### 9.3.10 Fish traps

Site QNMR 10114 is an intertidal fish trap system comprised of stone built walls that form six arcs along the coastline. The whole system is 1.465km in length and is 885m wide. The walls are 0.50m wide and vary in height from 0.40m up to 0.80m (Figure 9.38). [Figure 38]

Site QNMR 10137 is situated to the south of site QNMR 10114. It is comprised of stone built walls that form five arcs along the coastline (Figure 9.39). The whole system measures 2.6km in length and 713m in width. The wall thickness varies from 0.40m up to 1m and the height varies from 0.20m up to 1m. This system has additional walls that run off the main wall at right angles and two of these walls have additional metal poles and netting. Closer to the coastline are the remnants of other walls that may be an earlier phase.

Site QNMR 10174 is comprised of stone built walls that form four arcs along the coastline (Figure 9.40). The site is situated within the intertidal zone to the southeast of the large villa compound on the coast south of Al Furayhah. The system measures 1.12km in length and is 846m wide. The wall thickness varies between 0.40m and 0.80m and the height varies from 0.10 up to 0.68m.

Site QNMR 10175 is a fish trap comprised of a stone built wall that forms an arc. The wall varies in thickness between 0.48m and 0.50m and is 0.60m in height. To the south is another linear wall running west from the coastline. This wall was 0.60m in height and its thickness varied between 0.40m and 0.80m. The whole system measured 263m in length and 253m in width.

Site QNMR 10176 is a fish trap system situated within the bay to the west of the abandoned settlement of Al Furayhah (Figure 9.41). It is comprised of low stone banks that form 3 arcs along the

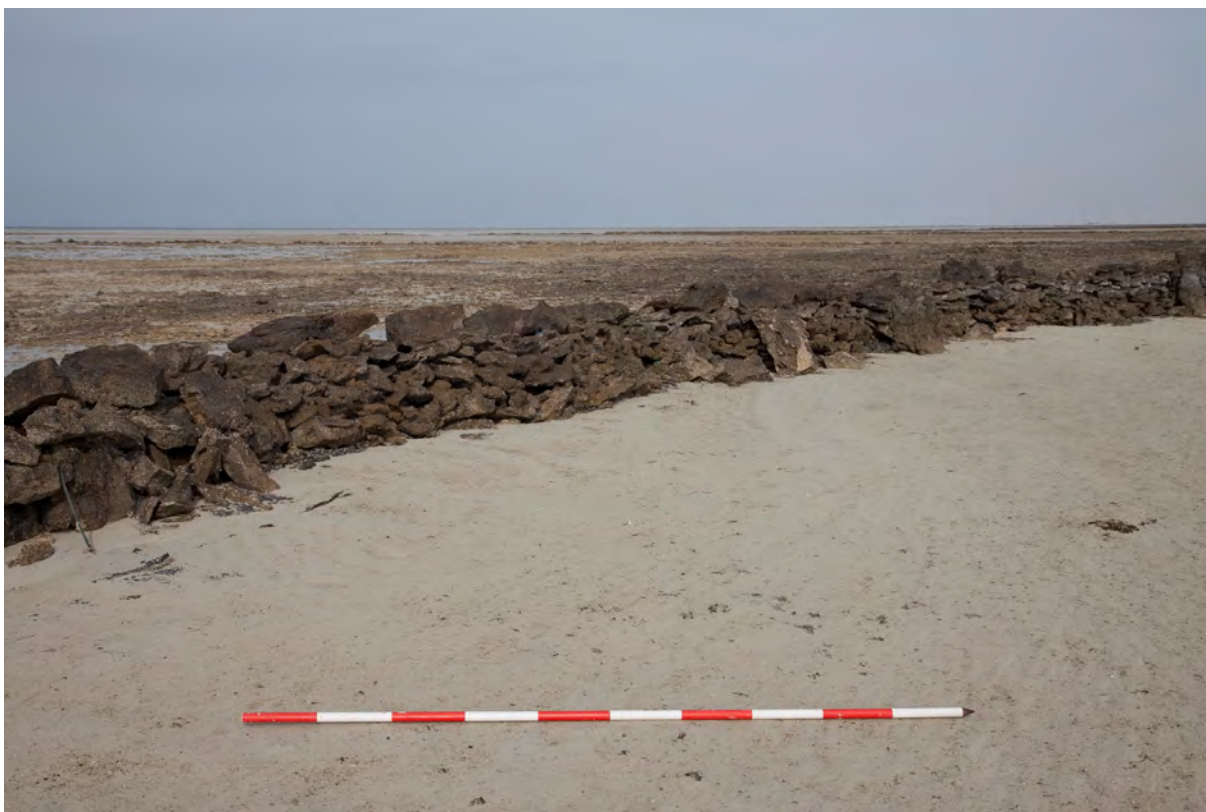


**Figure 9.36:** Site QNMR 10244, possible grave cairns and collapsed structures within settlement



**Figure 9.37:** Site QNMR 10321, collapsed structure





**Figure 9.38:** Site QNMR 10321, collapsed structure



**Figure 9.39:** Site QNMR 10137, part of fish trap system with additional mesh structures





**Figure 9.40:** Site QNMR 10175, part of a fish trap system



**Figure 9.41:** Site QNMR 10176, fish trap system with elongated cairns

coastline. The whole system measures 597m in length and 239m in width. The northern arc is unusual in that it has 18 elongated cairns at intervals behind the stone arc.

Site QNMR 10177 are remnants of intertidal fish traps comprised of loose scatters and alignments of stones spread over an area measuring 139m x 171m.

Site QNMR 10213 is part of a intertidal fish trap comprised of a curvilinear wall 0.40m wide and 340m in length running northwest from the promontory to the north of Al Zubārah.

### **9.3.11 Dumps**

Site QNMR 10245 is described as an unknown feature possible mound (Figure 9.42). It is comprised of a series of stone dumps as well as other general rubbish. It is square in shape and measures 20m x 19m. Similar to the mounds of material recorded in transects, sites QIAH 2065 and QIAH 2069.

Site QNMR 10229 had previously been described as a possible collapsed former structure. This feature is comprised of discrete dumps of stone that form a sub circular shape. The extent of the site measures 30m x 27m. To the west of this feature collapsed wall lines are visible in the ground and there is a demolished modern concrete block structure. On the east side of the site is a midden that measures 17m x 14m. This may relate to the collapsed wall lines or to the main city of Al Zubārah.

Site QNMR 10230 had previously been described as a possible collapsed former feature or enclosure. This feature is defined by a series of discrete dumps of stone that form a sub rectangular shape. It measures 30m x 10m and is situated 35m to the north east of QNMR 10230 (Figure 9.43).

### **9.3.12 Cleared areas**

Site QNMR 10310 is described as a cleared area that may be a camp or structure. It is a natural flat depression measuring 80m x 36m (Figure 9.44).

Site QNMR 10311 is described as a cleared area roughly circular at the end of a trail leading from the road, which may be a possible camp or structures (Figure 9.45). There is a sub circular shallow depression that measures 53m x 35m that has been created by a machine. There is a bank also constructed by machine 0.70m high and 337m in length that starts at the depression and curves round to the northwest stopping at the Al Shamal road. It has been truncated by a later easement track that runs parallel to the Al Shamal road. There is a linear depression along the northern side of the bank where material has been taken to construct the bank. There is another machined area to the northeast measuring 163m x 93m, north of the wadi barrier QNMR 10309. It is possible that these machined areas have been used to provide material for the barriers.

Site QNMR 10312 is partially cleared area measuring 25m x 20m surrounding an isolated tree (Figure 9.46). There are remnants of sand and shell spreads covering this area with no other clearly discernable features, apart from a concrete footpad for a toilet and a cess pit.



**Figure 9.42:** Site QNMR 10245, dumps of stone and general rubbish



**Figure 9.43:** Site QNMR 10230, dumps of stone





**Figure 9.44:** Site QNMR 10310, natural flat depression



**Figure 9.45:** Site QNMR 10311, bulldozer scars and earthwork bank



**Figure 9.46:** Site QNMR 10312, area with a sand and shell spread



**Figure 9.47:** Site QNMR 10232, remnants of a linear feature running off the outer wall off Zubārah

### 9.3.13 Other features

Site QNMR 10232 is comprised of remnants of a linear feature running southwest off the city wall across the intertidal zone (Figure 9.47). The feature measures 46m x 2.70m and is comprised of two discontinuous lines of rock. There appear to be remnants of this feature stretching further out into the intertidal zone.

Site QNMR 10236 consists of two rectangular areas of mangrove defined by clumps in four or five rows within the intertidal zone. The largest northern area measures 20m x 6m and the southern one measures 12m x 6m. Smaller mangrove clumps grow to the northwest and to the south.

Site QNMR 10242 grid reference locates a rectangular cut with a spoil heap on its southern side. This appears to be a soak away or cesspit located in the southwest corner of a large demolished compound. The fence line has been removed but remnants of the steel fence posts are still visible. The extent of the site measures 148m x 143m. To the north of the soak away or cesspit are two rectangular areas that have the remains of regularly spaced concrete block piers. These are the foundations for temporary accommodation or ablution blocks. Both areas have a drain on the western side with inspection covers that drains to the south into the soak away or cesspit. There are the remains of two other temporary buildings on the north side of the compound. Within the compound are at least two temporary tent positions. This is the remains of a modern construction camp probably in use while constructing the military radar station to the north.

Site QNMR 10243 is comprised of four sub circular shallow mounds of spoil around the concrete anchor points for the steel cables of an electricity pole.

Site QNMR 10318 is described as an unknown elevated feature (Figure 9.48). It is an irregularly shaped bulldozer scar. It measures 30m x 29m and is situated on the higher ground to the north of site QIAH 2000 that also has a number of these cuts.

### 9.3.14 Rock outcrops

There are two large rock outcrops within the survey area that are known for rock carvings and have a Qatar Museums Authority sign and site number. These sites are both called Gebel Freha, labeled as site M15. The largest lies to the east of the abandoned settlement of Al Furayhah and measures 344m x 100m, and is roughly aligned N-S. Scattered over this outcrop are a number of rock carvings.

The other outcrop lies 2km to the south and measures 374m x 120m and is aligned NW-SE. This outcrop has a number of clusters of these carvings in addition to some carved graffiti. This outcrop shows clear signs of quarrying activity in the past (Figure 9.49).

Fragments of the carved stone designs were retrieved or noted from one transect and from the abandoned settlement at Ain Mohammed. Damage has also been caused by the construction of a geodetic point and two earthworks from site QNMR 10234 have been constructed against the outcrop (Figure 9.50).

To the north east of the northern outcrop at Al Furayhah are a series of five smaller outcrops that form discrete clusters of irregular shaped mounds that extend east to the Al Shamal road.





**Figure 9.48:** Site QNMR 10318, bulldozer cut



**Figure 9.49:** Site M15, evidence of quarrying with a prepared block of stone ready for removal





**Figure 9.50:** Site M15, general view of outcrop with geodetic point and earthwork from site QNMR 10234



**Figure 9.51:** Site M15, general view of outcrop with geodetic point and earthwork from site QNMR 10234





**Figure 9.52:** Site QNMR 10186, general view of outcrops



**Figure 9.53:** Site QNMR 10187, general view of outcrops



These sites QNMR 10184, QNMR 10185, QNMR 10186, QNMR 10187 and QNMR 10188 all have examples of the common styles of carving found on these outcrop (Figures 9.52 & 9.53).

The two main designs found on the outcrops are a rosette pattern or two parallel lines of circular depressions (Figure 9.54).

The rosette pattern consists of a central circular depression surrounded by nine other circular depressions to form a rosette (Figure 9.55). The two parallel lines usually have seven depressions in each line but there are examples with more. The designs tend to be found on the high points and the surface can be completely covered in them. The designs do occur as discrete examples and there are occasionally larger sub circular and oval shaped depressions.

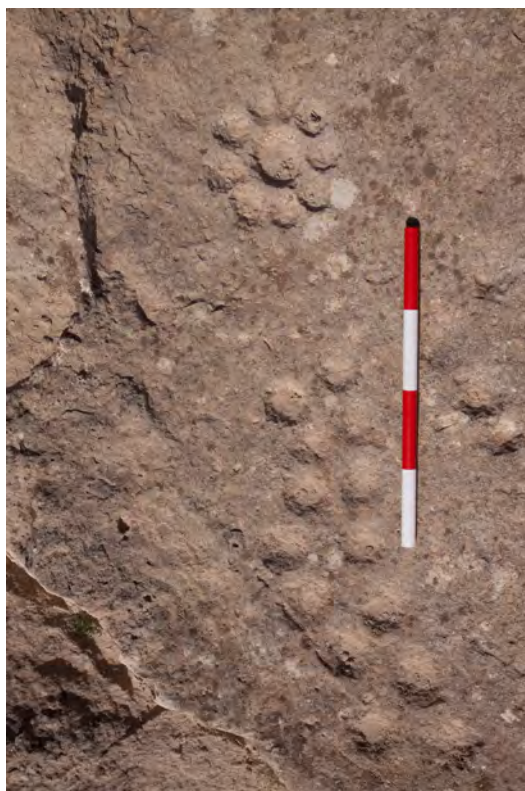
## 9.4 Summary

A regional survey north of the Ras Ushayrig – Zubārah road was carried out from early December 2009 until the end of March 2010. Around c. 50 km<sup>2</sup> were covered by four surveyors walking a total of 162 transects across the landscape. In total 152 archaeological sites were visited; 95 of these (62%) had not been previously recorded, while 57 (38%) had previously been documented using satellite and aerial imagery by Birmingham Archaeology on behalf of QMA. The records for the latter sites were updated and additional descriptions, photographs and plans of these sites were made. New sites were allocated Qatar National Monument Record numbers. Although many of the sites that were newly identified were quite ephemeral or relatively recent (e.g. modern/ recent Bedouin and other camp sites), others were somewhat more significant for the understanding of the historic landscape (e.g. wells, graves, grave clusters and cemeteries). This highlights that while that field walking significantly enhances the resolution of the available dataset by adding a range of ephemeral sites to the database and by providing surface material for initial dating.

Little to no evidence was found for prehistoric landuse in the survey area. Only three worked pieces of flint were found, one of which appears Palaeolithic in age. The second is a bifacially worked, broken arrowhead with evidence for pressure flaking that likely dates to the late Neolithic or early Bronze Age. The other piece of worked flint was undiagnostic. Thus, the survey area appears to contain little evidence for prehistoric activity.

No clear evidence for proto-historic, classical, early Islamic or Medieval activity was found either. Many sites may simply be too ambiguous or have produced insufficient dateable evidence to allow for the identification of these time periods. Thus, the vast majority of sites recorded fall into the post-medieval, early modern or recent time periods. Many can likely be related to the major expansion of settlement that occurred in northern Qatar from the early 18<sup>th</sup> century onward, but this needs to be further clarified by the more intense study of material culture from sites, principally coins and ceramics, as well as obtaining material culture from sealed deposits.

Temporary camps were the most predominant site type recorded, many of which were of quite recent date. They usually consist of tent clearings, hearths or fireplaces, and stone alignments accompanied by modern material culture. Few cemeteries or graves were recorded and many are difficult to identify. They appear to mostly date to the Islamic period. A wide range of 'structural features' were recorded, which reflect the considerable impact of development on the local environment and landscape.



**Figure 9.54:** Site QNMR 10184, two main designs found on the outcrops



**Figure 9.55:** Site QNMR 10184, a cluster of designs

Their dating is, however, very difficult. Wells are a recurrent and important feature of the local landscape as reported by Macumber (2009, and see Section 5 of this report). They are quite numerous in the surrounding landscape and often – but not always – associated with settlements in the survey area.

Sites previously recorded by Birmingham Archaeology in the QIAH's survey area studied this season fall into several categories. The most distinct are enclosures, cemeteries, grave clusters, earthworks, wells, settlements, forts and inter-tidal fishtraps. Enclosures vary in size, shape and size. They likely date to different periods of seashore and foreshore exploitation, although diagnostic surface material was often not found. Most of the earthworks encountered appear to be of a modern date, since they appear to have been created by machinery. They likely reflect military activities in the area. A number of wells were previously recorded by reconnaissance survey, which fall into the same kind of categories as above. A variety of types of wells exist, and once again they are often closely related to larger or more permanent settlements. QNMR #10320 is a fort close to Zubārah that appears of particular interest and should perhaps receive further protection. This is a site may very well be contemporary with Al Zubārah and should receive further study in the future. Previously recorded fish traps were also re-visited and recorded. They represent a highly interesting economic practice to capture large amounts of fish using the natural tides, and are still sometimes used today. They are commonly associated with major settlements in the region.

Overall, the regional survey has successfully located additional sites adding to the emerging picture of landuse and settlement in northwest Qatar. Work in the future will concentrate on dating some of the identified sites securely to better understand with which phases of Zubārah they were contemporary, and what the specific economic and social relations between these sites were.



## 10. Conservation and Preservation

*Moritz Kinzel & Ingolf Thuesen*

### 10.1 Introduction

In March 2008 the site of Al Zubārah and its immediate hinterland was submitted for designation as Qatar's first cultural UNESCO World Heritage Site. The site's nomination highlights the outstanding universal cultural value of the Al Zubārah landscape. This traditional pearling settlement is now one of the only surviving complete 18<sup>th</sup>-19<sup>th</sup> century town-plans of its type in the Arabian Gulf, and as such it is a unique resource for learning more about the lives of the fishers, pearl divers and traders who exploited these waters for hundreds of years.

The process of nomination includes a number of steps. The most important is the development of a Management Plan detailing how the site will be used and protected. Like many archaeological sites, Al Zubārah is at constant threat from erosion, degradation and human impact. Before the site can be accepted onto the World Heritage list these issues and their solutions must be addressed. Therefore, developing a sustainable approach to the conservation and presentation of archaeological remains is at the forefront of the current work of QIAH. The ultimate aim is that the site can be utilised and enjoyed as an archaeological resource, now and in the future.

Monitoring the environmental impact on the site is critical. For this purpose we are setting up weather stations across the site to accurately record the variations in temperature and moisture. This will allow conservators to identify the causes of structural erosion and understand how best to prevent further damage. In the past excavated walls and exposed features have been consolidated using a variety of different methods including concrete plastering. Unfortunately, thus far all attempts to preserve structures have succumbed to the extreme climatic conditions of the site's coastal location - a highly saline atmosphere, fluctuating ground water, intense heat and fearsome winds. We have begun a series of trials using wall plaster and traditional local construction methods, to research a method of consolidating excavated architecture in a way that is more suited to this particular environment. In the future a continuous programme of conservation and maintenance by a master craftsman trained in traditional building techniques aided by a small work crew will have to be put in place.

Human impact has also had a detrimental effect on the archaeology. Strong tides washing onto the historic harbour beaches, deposit vast amounts of bottles, bags and detritus which have been cast into the sea. Tracks from heavy vehicles and tourists criss-cross the undulating mounds, wearing away at the fragile beach-rock walls beneath the sand. In conjunction with the Qatar Museums Authority, we are in the process of assessing this impact by mapping the extent of archaeological remains around Al Zubārah and Murayr and conducting regional survey to examine the wider hinterland. This landscape study will enable government authorities to fence archaeologically sensitive areas, and re-route traffic away from the current tracks through the site.

Gaining World Heritage Status will herald a significant increase in tourism at the site; a potential threat to delicate fragments of Qatar's past but also a chance to communicate its significance to a wider audience. By reconciling these opposing factors it will be possible to continue to explore the rich culture that inhabited Al Zubārah and its part in the shaping of the modern Arab world.

In the 2009/2010 field work season following task have been initiated/ accomplished within the heritage programme:

## **10.2 Master Plan**

The project is structured in a master plan that is specifically developed to the character of the remains and the policies and intentions by the State of Qatar. The master plan is structured along three main parameters: preservation, management, and presentation. The outline of the masterplan has been worked out under the title “The Zubarah National Heritage Park – A string of Pearls” here the most important locations in the region are identified and a number of themes to be presented to the visitors are suggested.

## **10.3 Preservation**

A major challenge is to protect the remains against general decay and public use. General decay is a critical threat to the site. The environment is harsh with high saline concentration and extreme temperatures (during the summer >50+ C). The preferred building materials and mortars, a soft beach stone and a gypsum based plaster, cannot survive exposure without a protection plan. First step is the identification of the chemical reactions and hereafter to develop a conservation strategy that applies suitable materials and techniques in order to optimize the protection. Continuous maintenance has to be seen as a part of the heritage conservation of the archaeological remains.

Protection against public use includes fencing and guarding of the sites and regulation of access and traffic in the area.

Protection: The position of a fence has been determined. This is considered a high priority project in order to stop the deterioration of the site due to traffic and camping within the field of ruins. The fence is proposed to include Murayr and the Zubarah Fort at the junction of the paved roads. Another fence is suggested also for Freyhah.

Conservation of architectural remains: A number of samples of mortar have been analysed in order to determine the chemical composition. Following the results of the analysis some test mortars were applied to the walls in the northern part of Zubarah, where we intend to carry out experiments in conservation techniques on architecture exposed during excavation carried out about 10 to 25 years ago.

The results of the test of mortars are available late in 2010 where we shall propose a final methods for wall conservation.

As a first step in conserving the etching of a dhow, incised into the wall in the compound excavated in ZUEP01, a matrix was made of silicon and from that three copies of the image were produced a gypsum casts. In addition, high resolution 3D-Laserscans are planned for the coming season.

## **10.4 Work carried out in 2009/2010**

For a proposal concerning the preservation strategy for the archaeological site Al Zubārah according

to the general guidelines for heritage sites a survey was undertaken in November 2009. The all excavation areas, the city wall and the previously consolidated areas were visited, documented and analysed preliminarily (see Appendix VI; Figures 10.1 & 10.2).

In general, the site is very deflated and fragile. The building remains still covered by overburden seem to be relatively well preserved, but exposed sections are in a bad state. High salt concentrations in the deposits and the ground are one of the primary environmental threats posed to the architecture. The exposed building remains are also very fragile, partly relative unstable and collapsing or collapsed. The unexposed archaeological remains are in danger by off-road crossing cars and natural erosion processes. The high salt concentration causes the dilapidation of the very soft beach-stone material, the gypsum plaster and the lime mortar. This is a result of the environmental conditions of the region and cannot be mitigated. In the old areas of excavation several forms of decay and dilapidation are attested, mostly aeolian and alluvial erosion processes.

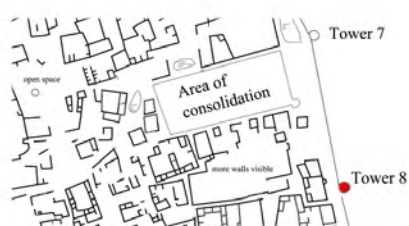
The old, southern excavation area, next to the destroyed mosque of Al Zubārah, was chosen to make an exemplary documentation of the state of preservation. All rooms in this area, which was already consolidated in the 1980s, were recorded separately. Each wall face was photographed and described (see Appendix VII). Although the area was consolidated the walls are not well preserved. The cement coat on the wall crown is, in general, too hard. The softer beach-stone is blown-out and/or washed-out. This results in deep, large voids in the wall structures, gaps between wall stones and walls. The wall plaster is often not connected with the wall stones behind. In parts the walls are collapsed. The fragile beach-stones completely disappeared in some cases. At the base of the walls deposits of washed-out material and/or blow-in sand are common. These deposits contain high concentrations of salts, which effects the lower parts of the wall plaster (Figure 10.3). Twelve samples of the building materials and deposits were chosen for analysis, e.g. from lime stone, sand stone, beach-stone (different kinds from hard to very soft), cement-, lime-, and mud mortar / plaster (for results see Appendix IX and below). The analysis will be helpful to find the right conservation/ consolidation-products according to the qualities and integrities of the historic building materials.

The following dilapidation and erosion processes are attested for the site in general (Figures 10.4-10.5):

- Aeolian out-blow.
- Pluvial out-wash.
- Cracking as a result of fluctuation of temperature and volume-changes of the sulphate/salt-crystals.
- Separation of materials through salt crusts.
- Decarbonation of the beachrock material and falling apart of the beachstone into single ingredients like Snails, Sand, and Molluscs.
- Erosion caused by gravity. Collapse and dilapidation of walls and wall faces as a result of too heavy load from cement capping.
- Voids in wall structures (depth up to 37 cm) partly through the whole wall.
- Loose wall plaster with gaps between wall and plaster up to 6 cm.



Az Zubarah			2009
Outer CITY WALL	State of Preservation	Documentation	
Tower 8			Date: November 2009



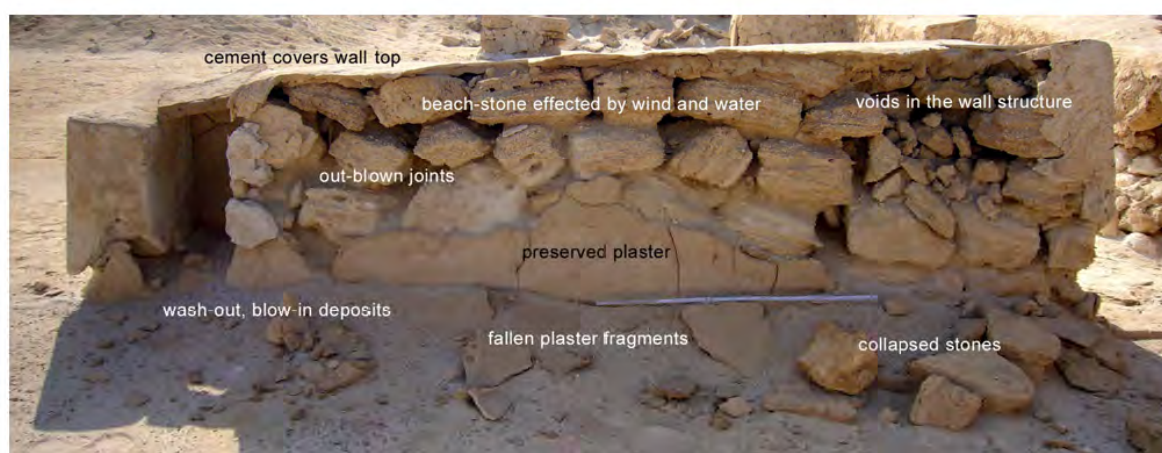
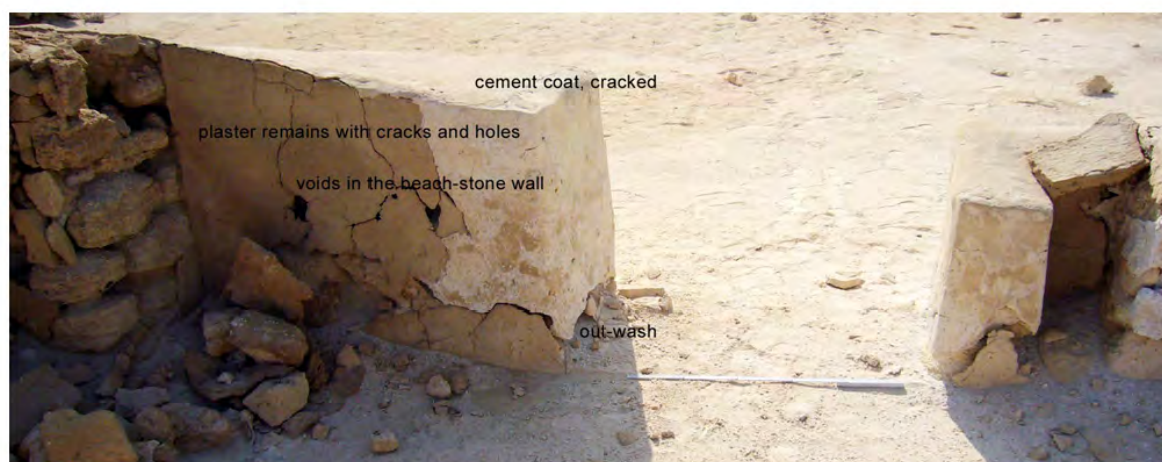
T8 seen from North.



T8 from SE.

**Figure 10.1:** State of preservation documentation system using the example of the outer town wall Tower 8.

<i>Az Zubarah</i>	Documentation State of Preservation	November	2009
old excavation area	South field	Catalogue	
<b>R.006</b>	<b>Wall c</b>	Date: 18.11.2009	



Wall c	
Description	Consolidation/Conservation suggestions
<p>Mud/soil plaster (?) is preserved at the bottom of the wall and in the eastern part approximately 2/3 of the wall plaster preserved.</p> <p>Additions with cement mortar.</p> <p>Voids (up to 20 cm depth).</p> <p>Central part of the wall: beach-stones, with soil mortar: massive wash-out &amp; blow-out of wall materials.</p> <p>Voids and gaps in wall structure.</p> <p>Collapse of stones.</p> <p>This wall segment is very unstable and fragile!</p>	

**Figure 10.2:** State of preservation recording system using the example of the south field exposed archaeological remains.





**Figure 10.3:** Salt encrustations commin the soil at Zubarah



**Figure 10.4:** Example of typical wall damages



**Figure 10.5:** Example of damages induced by pressure from heavy concrete capping.



- Accumulation of in-blown sand and salt deposits effecting the eroded stones at the wall bottoms.

First mineral analysis of building materials were undertaken by Dr. Robert Sobott, Labor für Bau-  
denkmalpflege Naumburg (see Appendix IX). The key findings from the analysis can be summarised  
as follows:

- Walls were build using a lime mortar as bonding material.
- Gypsum plaster was used to cover the wall faces.
- The soil in Zubarah contains more than 30% salt (sulphate, etc.).
- In these conditions *fragile gypsum cannot be restored or consolidated*. The gypsum already has high sulphate concentrations and cannot be saved, even if the whole environmental conditions could be changed.

To better understand the effects of local road traffic on the historic substance, a vibration monitoring system was installed in the Al Zubārah Fort. Vibration measuring units were placed in each corner tower of the fort. The analysis of this data will help to evaluate the structural and surface damages in the Zubārah Fort for future investigations.

## 10.5 Conservation Experimental Work

Heritage conservation requires a program of continuous monitoring and maintenance of all parts of the archaeological site. Single event investments does not cater a long term survival of the archaeological and architectural remains. Especially in the context of archaeological, respectively architectural remains, at least an annual monitoring and maintenance program is necessary. As part of the monitoring process damages to the historic building substance has to be recorded and assessed to better understand the natural decaying processes in the local environment across a certain period of time. On this basis a priority list of needs can be etsbalished, leading to the early identification of problems and issues to be addressed. The priority of needs will then have to be addressed as part of an annual maintenance program, according to which different methods and operations will be carried out. For these purposes, all documentation data and conservation measurements have be documented in a log book for each single architectural unit.

A preliminary manual for on-site conservation could include the following guidelines:

**1. *relatively well preserved walls (newly excavated)*:** consolidation of wall faces and wall top with lime mortar. Appearance should be close to the actual state. (closing of joints, covering of soft beachstone, covering of gaps and joints between plaster and wall structure, removing of plants)

**2. *walls (old excavation areas) still standing, heavier damages*:** cleaning of joints and voids, new mortar in joints and if necessary new wall stones in voids or larger gaps, removing of vegetation. All additions will be documented in a log book for each architectural unit. The decision how to mark “new” additions will be part of the test and evaluation process.



**Figure 10.6:** Example of fragmented, damaged wall plaster



**Figure 10.7:** Mortar test series

**3. Wall partly collapsed, cement capping still shows wall structure:** “reconstruction” of wall structure to catch the spatial appearance. Filling of joint with new mortar. Vanished or eroded stones should be replaced with old stone material from the excavation areas.

**4. Completely collapsed walls and structures:** should be left in the way they are now. A reconstruction seems to be impossible in most cases and will create problematic interpretations. UNESCO guidelines do not permit reconstructions on-site. But areas like the *suq* can be reconstructed from the old documentations in the Conservation Department of the QMA to show and preserve the functional structures, as long as it is clearly explained that what is seen today is a reconstruction based on photographic records from the 1980s.

For the protection of non-excavated remains, and also for the archaeological remains already excavated, a clear vehicular traffic system should be installed to avoid uncontrolled and destructive off-road driving. These tracks will be part of the site presentation system (and should be self-guiding trails). The track system *intra-muros* should follow, if possible, the historical city plan respectively the ancient street system.

Test and experimental conservation and consolidation work will be carried out in the old excavation area „Northfield“ in June 2010. For a later consolidation and conservation of wall structures an initial test consolidation with mortar made with local soil took place at the south east tower of the old consolidation area next to tower 8 in November 2009. A mud/soil mortar made only from the local soils and water was used in this initial test. The joints of the chosen structure were cleaned of loose material and the mortar was pressed into the joints, gaps and voids. Finally, a slightly sloping surface was created to guarantee a protection against down running (rain) water. Evaluation after one week showed that the mud mortar seems to work out fine. A further monitoring after four months showed that most parts of the soil mortar were still in a good condition. Exposed parts were washed down and the mortar appeared partly loose (Figures 10.1 & 10.2). The high salt concentration did not seem to be a primary problem within that short period of monitoring (for more details see Appendix IX).

In general the old consolidation should now be seen as a part of the building and site history. In this case the cement coat would be kept as a historical layer. The cement layer should be removed only if the walls are in danger of collapse, because of the weight/loads of the cement capping. The removal of the cement coating can result in the loss of the whole wall structure, because of the enormous damages caused to the inner wall structures. Carefully rebuilding of parts of the cement additions and the stabilization respectively consolidation of the „original“ wall structure is required, also to keep the building structures still visible and understandable.

## **10.6 Moulding of a decorated plaster fragment and the dhow-etching in ZUEP01**

In March 2010 a copy of the dhow-etching on wall <615> in ZUEP01 was made. The whole process was documented with photos and film, and was described in a separate report by the specialist (Figures 10.8-10.11; see Appendix VIII).





**Figure 10.8:** Dhow etching in ZUEP01 coated in silicon

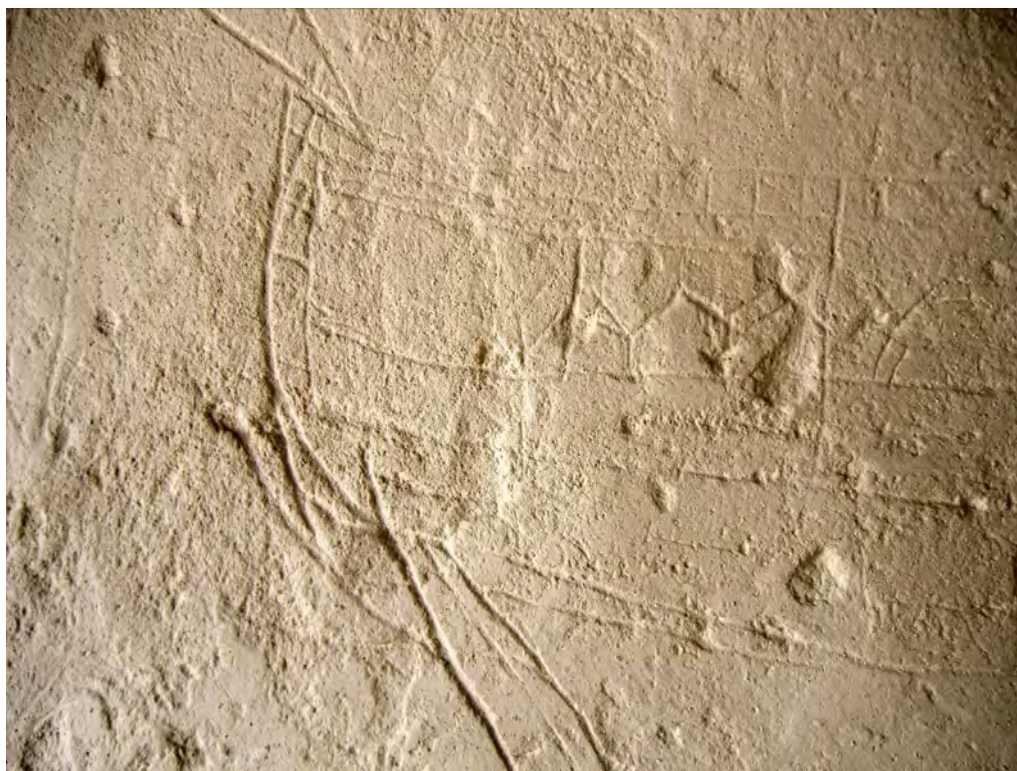


**Figure 10.9:** Foam cap made of epoxy covering the Dhow etching





**Figure 10.10:** Removal of silicon with impression of Dhow.



**Figure 10.11:** Detail of gypsum copy of Dhow etching

To create the mould the backfill in front of wall <615> was removed. The plaster surface was brushed with a soft brush to remove sand leftovers on the plaster surface. Before a layer of separation material was attached to the plaster surface a test with different separation materials was done on a wall plaster fragment with an equal surface quality. This suggested that a fixative was added to the gypsum plaster surface when it was originally made. This application seems to be responsible for the extremely good preservation of the wall plaster and the etching. A sample of the plaster with the application was taken for analysis. Perhaps there is an ancient gypsum-plaster conservation method which can be used also nowadays successfully.

A test moulding was made of a fragile gypsum wall plaster decoration in the corner of wall <626> and <631>. After this moulding was produced successfully, the work on the dhow etching began. All work was executed under a temporary shelter in order to protect sensitive chemical against direct sun-light and too high temperatures.

In a first step two layers of rabbit-skin-glue were applied to the plaster surface. After a few minutes when the rabbit-skin glue had dried, the wall plaster area with the dhow was coated with silicon (Reckli, spatula-capable silicone Si HR-N). This silicon layer had a thickness between 5 to 15 mm. By applying the silicon to the prepared plaster surface we intended to minimize possible air-pockets in the silicon.

After the silicon had hardened for 3 hours it was treated with separation-wax (Reckli, separation-wax Si). The form-cap was made with spatula-capable epoxy resin (Reckli). The covering was carried out in a Layer of 5 to 15 mm as well. The form-stability of the epoxy-resin was guaranteed by fibreglass additives within the resin. Additionally fibreglass-sticks were attached to the backside to make sure that the form-cap would not deform. For this epoxy related work the temperature was on the verge of being too hot to succeed.

After hardening of the cap over night, the cap and the silicon form were removed completely from the wall plaster. Although the pilot tests have indicated that the chosen separation layers will work out perfectly, an insignificant amount of the plaster surface stuck to the silicon. Probably this is a result of the before mentioned historical fixative or application to the gypsum plaster and the extreme climate conditions on the site. The moulding was transported to the Zubārah Fort to produce four copies of the dhow etching. The original wall plaster with the etching on is kept *in situ*. To protect the etching the plastered wall faces were covered with Hessian and backfilled with sieved soil to the top of the walls.

For the duplication of the dhow etching only the locally available gypsum (Qatari Saudi Gypsum) was used. Four copies were produced. All gypsum duplications are about 5 to 7 cm thick and were reinforced with steel for maximum stability. One copy remains on the form in order to minimize the shrinking processes of the silicon moulding. This copy stays together with the form in a storage room of the Zubārah Fort. Another copy was placed inside the fort for site presentation purposes. The other two copies were brought to the Archaeological Department of the Qatar Museum Authority in Doha. For a later presentation the copies can be prepared with colour etc. to reveal the original appearance. For a satisfying presentation also vertical highlight is required.



## 10.5 Conservation Measurements

For the future work we have to consider the following working steps: before any conservation or consolidation work can start, a documentation of the actual state of preservation and an inventory of the damages should be carried out. This should be done for all the excavation areas including the older ones, the city wall and other points of interest, where consolidation or restoration work is required. Based on this documentation the appropriate measures that have to be taken to preserve Zubārah's archaeological heritage can be planned and organized. A catalogue with the different methods will be developed during the test- and evaluation phase (see above).

In June 2010 some high sulphate resistance lime mortars imported from Germany will be tested. In an additional test a mud / soil mortar will be mixed with some fibres and /or other additives (likely wool or quartz sand; see Appendix VI).

After six months in December 2010 or January 2011, an evaluation of the mortar and conservation tests from June will take place. This monitoring period covers the extreme weather conditions during summer, fall and winter. The analysis of the test consolidation will provide the basis for a final conservation concept for Zubārah. Additionally different laser scanning techniques will be tested for the documentation of fragile ornamented plaster fragments and architectural remains.

## 10.6 Management

The management is based on a structure that is set up as a relational database. The major components are identified and for each the responsibilities are allocated to specialist coordinated by managers on different levels. This structure also includes estimation of use of resources and formulation of long termed strategies.

## 10.7 Presentation

For the site and park presentation an interactive GIS-based map and intuitive database system has been proposed as the way in which information on the site and its history is disseminated.

The park introduces the history and heritage to the visitors by identifying points of interest (POI), laying out a system of trails and facilities. Visitors are received in a visitor's centre with facilities and exhibitions that introduce the visitor to the site. The visitor's centre will be located at the fort which today serve as a landmark in the area. Visitors are presented with several theme options for a visit depending on interest and age.

The Zubarah Archaeological Heritage Park will be designed as a "green" park that is 100% sustainable and energy neutral and also integrates environmental issues.

## 11. Summary and Conclusions

*Tobias Richter and Alan Walmsley*

### 10.1 Introduction

The present report describes the findings and activities in Stage 2 of the Qatar Islamic Archaeology and Heritage Project. The following section summarizes the key findings and addresses the research questions outlined in Section 3, before offering some comments on the further progress of the project. Here, only the general research questions from section 3.1 will be addressed, since the more specific research questions relating to the different components of the project are more specifically addressed within each sub-section of the report relevant to these elements of the project .

### 11.2 Research Questions

*1) Was there a settlement at Al Zubārah prior to the arrival of the ‘Utoob during the 1760s?*

Work during this season has not found any firm evidence to suggest that there was a settlement at Al Zubārah before the 1760s A.D. However, this could simply reflect the location of the excavation areas, which may simply have missed earlier phases of occupation. Excavations in ZUEP01, at least, have shown that there was an ephemeral phase of occupation consisting of *tannūrs* set into the natural sub-soil, accompanied by postholes prior to the construction of stone-built architecture. A similar ephemeral phase of occupation was evident in ZUEP03. This suggests that there may have been a previous phase of occupation at Al Zubārah that consisted of temporary structures, such as tents or huts. This phase cannot be precisely dated at this stage; in ZUEP01 it could either be the initial phase of ‘Utoob settlement prior to the construction of more substantial buildings or instead represent a much earlier phase altogether. Further analysis of the material culture, in particular coins and ceramics, will provide a better understanding of the dating of this and other phases at the site. The question whether there was a pre-‘Utoob settlement at the site, therefore, remains of particular interest for further investigations at the site, particularly because written sources on this issue appear to be contradictory.

*2) Did Zubārah primarily have an import-based economy driven by fishing of and trade in pearls, or was there also an economic input from the surrounding hinterland?*

Early indications from our research suggest that Zubārah’s economy was not primarily or solely import-based. Imported goods are evident in the various types of foreign ceramic wares at the site (see Appendix I), which derive from the Far East and Europe, but also more locally (e.g. modern-day Iran). But, the ceramics are only one of many material aspects that help to reconstruct economic patterns. The preliminary analysis of faunal remains from three of the four excavation areas shows, for example, that sheep and goat provided an important source of food for the settlement’s inhabitants (see Appendix III). While fish was also an important food resource, it is likely that sheep and goat

were kept in the hinterland of the settlement, close to suitable grazing and fresh water; it is not necessary to assume that they were imported. The regional survey (Section 9), as well as the geoarchaeological work reported here (Section 5), show that there are multiple rural sites in the surrounding countryside, which are likely contemporary with the main phase of settlement at Al Zubārah. Although many goods were undoubtedly imported, Al Zubārah's economy depended just as much on local imports, as much as on imports deriving from an export-import economy driven by the pearl trade. The reconstruction of these economic aspects in greater detail will form part of QIAH's future research strategy.

*3) To what extent does the archaeology confirm or contradict written sources on Zubārah and north Qatar?*

Our investigations have provided tantalizing evidence for several events recorded in written sources, although the chronological and causal links for some of the archaeological signatures to these historical occurrences require further evaluation.

Above we already alluded to the uncertainty over the first settlement of Al Zubārah. Present data does not allow us to verify claims that Zubārah was settled for the first time when the 'Utoob arrived in northwest Qatar – as is suggested by some written sources – or whether there was a pre-'Utoob settlement at Zubārah.

Evidence for wide-spread burning and damage by fire was found in ZUEP01, ZUEP02 and ZUEP03. This burning event terminated the major architectural phase at the site and suggests a fairly sudden, catastrophic and destructive occurrence. Further analysis of material culture to clarify the chronological phasing may allow us to link such instances of burning to the attack and apparent destruction of the town by Omani forces in 1811 (see also Section 2). Written records suggest that the town was attacked and torched, and then largely abandoned. The fact that the evidence for burning in ZUEP01 pre-dates the construction of the inner town wall, and that it terminates the phase with the best constructed and most substantial architecture on site, would both suggest a possible connection to this event.

Following the 1811 attack Zubārah is described as a “small settlement amongst extensive ruins” (see Section 2) in British documents (Brucks 1924). Archaeological evidence suggests that the inner town wall post-dates the major architecture, which is characterized by large buildings that were built on a planned street grid system and used higher quality limestone. The inner town walls construction following this phase shows that the settlement shrunk to about 1/3 of its original size following this major phase. This would also correspond to evidence from written sources. Overall then we appear to be able to possibly link some occurrences in the written record to the archaeological remains at Al Zubārah. Further work on the chronological phasing of the material culture is, however, required to test these hypotheses further.

*4) What was the nature of Zubārah's urban topography?*

Zubārah's urban topography shows a significant degree of planning in its layout and urban structure.



The city plan compiled as part of this project shows that many areas are highly regular in layout, which suggests that they were planned and executed as part of one overall enterprise. Many aspects of the city plan are linked into one another, forming a functioning whole especially during the early phase of occupation. There is some evidence that many access routes and roads were laid out to run toward the sea front, which shows that commercial and maritime activities were considered highly important.

Our research has also shown that apart from stone-built architecture there was a further element to Zubārah's urban fabric. There is widespread evidence for tents and/or temporary structures now, from several excavation areas and several phases of occupation across the site. ZUEP01, ZUEP02 and ZUEP03 have all produced evidence for *tannūrs*, postholes and thin occupation surfaces that likely relate to flimsy structures, such as tents or historically documented palm mat and leaf huts common in other parts of the Gulf. And, those found in ZUEP03 are likely to be contemporary with the major architectural phase on the site, since they immediately pre-date the construction of the inner-town wall (see below). This suggests that, at the same time as major buildings were constructed, the urban topography also included tents and temporary camps along the edge of the major building complexes and neighbourhoods. This will in the future provide some interesting insights into the social fabric of Al Zubārah's urban society.

#### *5) What trade links can be reconstructed from the material culture at the sites?*

There is no certainty yet regarding trade links, based on our preliminary analysis of the material culture. What is clear is that, in terms of the ceramics, a wide range of material from far afield arrived either through primary, secondary or tertiary exchange at the site. Porcelain that was produced in England, the Netherlands, China and Japan are all present on the site. But, there is also copious amounts of ceramic material from more local sources, such as Khunj in modern-day Iran. It is tempting to think that many of the more high-status porcelain may not reflect direct trade links with China, England or the Netherlands, but may reflect contacts to other international centres where such wares were re-distributed from their original source. Likewise, more locally available wares may reflect more direct local trade links and contacts, as many ports around the Gulf would have served as redistribution centres for locally produced wares. Once they have been properly cleaned and analysed, coins may provide a much more compelling picture of trade and economic links with other regions and places.

#### *6) What can be learnt about the constitution of people's identities through material culture, consumption and architecture?*

Since the study of the material culture is ongoing, more can be said at this point about social identities based on architectural features and faunal remains. Where architecture is concerned, differences between the size and constitution of buildings can be clearly detected. Excavations in ZUEP01 have revealed evidence for two very similar courtyard buildings (Compound 1 and 3; see Section 6.1). These produced evidence for both architectural elaboration in the form of arches, dog-tooth pattern incisions on walls and doorways, as well as elaborate entrance halls. The latter indicate the importance placed on both the reception of guests. Compound 1 also produced several instances of

washing and ablution installations, which consisted of plastered basins with outlets that were sometimes partitioned off from the room. Wall decorations, ablution blocks and the size of the courtyard buildings suggest that the inhabitants had access to sufficient economic resources to embellish their homes and display their status, at least within the private space of the house. It is tempting to identify these buildings with merchant families that immigrated to Zubārah as part of the ‘Utoob arrival. They likely formed a key stratum of society, being involved in the pearl trade and probably also the procurement of pearls, which formed the economic basis of Zubārah.

Architecture also helps us to make some inference about the inhabitants of the so-called ‘palatial compound’ excavated in ZUEP04. The size and fortified character of this compound suggests that the inhabitants likely were members of Zubārah’s ruling elite. Fragments of decorated wall plaster, arches, as well as plaster-lined rooms and exterior walls, indicate that the inhabitants were able to mobilize significant resources. Too little of the compound has yet been excavated to provide more clues to the spatial arrangement of the entire structure or further high-status embellishments. Excavations in ZUEP04 did, however, cut into a midden adjacent to the compound. Excavations here provided further insights into the high status lives of those occupying the compound. As the preliminary analysis of the faunal remains shows (Appendix III), the occupants of the fortified compound had access to higher status foods (reflected in the higher sheep versus goat ratio and lack of fish bones), and also engaged in the occasional hunt, as the remains of some gazelle in the sample show. The latter in particular indicates not just a high status diet, but also leisure activities potentially characteristic of elite pursuits. Faunal remains from ZUEP01, in contrast, indicate a much higher ratio of fish consumption, which suggests that there may have been much less disposable wealth in these households despite the display of status in the architecture. It also strengthens connections of these compounds with maritime life and industry.

Archaeology has also provided a further interesting insight into the social stratification of Zubārah’s society. Excavations in ZUEP03 in particular have produced evidence for tents and/or huts within the walls of the settlement. These minute traces of occupation appear to be contemporary with the main occupation at the site, which suggests that these were the living spaces of people who were not able economically to build stone houses for themselves. They may relate to occasional Bedouin communities who were permitted to camp inside the protective screen of Zubārah’s walls and towers. But it is equally tempting to think of these structures as temporary occurrences that relate to the annual pearl fishing season, when people flooded to the ports to join the pearling fleets as divers and crew on the dhows. The history of these people who arguably carried the economy of the pearl trade, has so far rarely been studied or analysed, and the post-holes, tannūrs and occupation surfaces in ZUEP03 provide some tantalizing evidence for their participation in the life of Zubārah.

Where the material culture is concerned much more work has to be carried out to fully understand how it may relate to the identities of Zubārah’s inhabitants. It is interesting to see that both porcelain coffee cups and clay tobacco pipes were common in all excavation areas, which highlights the importance of both receiving guests (serving of coffee) as well as engaging in social encounters. These are important elements of Islamic societies in many parts of the world. Many porcelain pieces also show signs of repair and curation, which suggests that they held quite a lot of importance and meaning to their owners.

## 11.3 Summary of Key Findings

### 11.3.1 Archaeological Phases of Zubārah

From the excavations in 2009 and the work reported here, we are now able to distinguish six broad phases at the site. These phases can be further sub-divided in particular areas or even across the site as a whole, and the earliest identified phase may not necessarily be the earliest phase at the site (even earlier phases may be located outside present excavation areas). The further sub-division and chronological placing of these phases will require further more intensive work on the material assemblages to fine-tune our dating. There are necessarily some differences in the presence of phases in the different excavation areas. To correlate the different phases, Table 11.1 provides an overview of the different phases in each excavation area, and how they relate to the phasing of the site as a whole. This

Zubarah Phases	ZUEP01 Phases	ZUEP02 Phases	ZUEP03 Phases	ZUEP04 Phases	Comments
I	1	1	1	1	Sporadic use of the site, construction of modern road; modern, post-1950s occupation
II	2	2	1	1	Ephemeral settlement, windbreaks, enclosures, occasional <i>tannūrs</i> ; early 20th century occupation
III	3	3	2	1	Houses with large courtyards and few rooms, architecture generally of poorer quality - use of beach-stone as building material; construction of inner town wall and towers. ~1820s-mid/late 19th century?
IV	4	4	3	2	Ephemeral phase of occupation characterised by tents and/or huts in ZUEP01, and ZUEP02, following settlement decline/ abandonment after a major (catastrophic?) fire, time frame between 1811-1820?
V	5	5	4	3, 4	Primary phase of construction and occupation of Al Zubarah. Outer town wall built. Size of settlement reaches maximum extent of c. 100 ha. Courtyard houses and large -scale compounds, including the palatial compound built and used. Architecture predominantly well-made using limestone. ~1760s-1810s
VI	6	/	6, 5	/	Ephemeral phase of occupation documented in ZUEP01 and ZUEP03. Pre-'Utoob phase or initial phase of 'Utoob settlement at the site. Could be pre-1760?



initial attempt at correlating the different phases is, of course, based on preliminary observations and will require further examination as part of the ongoing fieldwork.

Starting with the oldest, the six phases thus far identified are:

#### ***Phase VI (pre-1760s?)***

Phase VI consists is a phase of ephemeral occupation traces excavated in ZUEP01 and ZUEP03. These occur in the form of postholes, tannūrs and pits, and likely represent the remains of temporary structures (such as tents or palm-leaf and palm-matt huts) and sporadic occupation.

This phase pre-dates the major settlement and occupation of Phase V (see below), but it is unclear by how much it predates it. It could either represent an incipient phase of occupation that occurred shortly after the Utoob's arrival at Zubārah, or an unrelated, even earlier phase of settlement. One radio-carbon date from ZUEP03 provides a proxy *terminus ante quem* for the occupations in this phase, having produced a date falling into the 16-17th century AD, but no earlier than the 16th century. Study of the material culture might provide some insight into this question.

#### ***Phase V (c. 1762/1766-1811)***

This phase represents the major phase of settlement at Zubārah during which the outer settlement wall, the major compounds, neighbourhoods and mosques were built and occupied. During this phase the settlement appears to have reached its maximum extent of c. 100ha and was at its zenith. This is the phase during which the Zubarah was an important regional settlement with major trade links in and beyond the Gulf. Architecture was mainly constructed of better quality limestone walls, faced with gypsum plaster, as documented in the three compounds in ZUEP01 (Phase 5), the 'shops' in ZUEP02 (Phase 5), as well as the 'palatial compound' in ZUEP04 (Phase 3/4). However, at the same time as major architecture is present, the cityscape also includes more ephemeral, temporary structures. Excavations in ZUEP0e (Phase 4) have shown that tent camps or palm-leaf and palm-matt structures were present, which were likely occupied by poorer fishermen and their families. This phase terminates with the widespread evidence for fire documented particularly in ZUEP01 and ZUEP03.

Historically, it is possible that this phase relates to the arrival of the Utoob during the 1760s, when they appear to have expanded a pre-existing settlement considerably or founded the settlement from scratch.

#### ***Phase IV (post-1811)***

This phase begins with the termination of the Phase 5 settlement by widespread fire followed by dilapidation and decay. It is characterised by the construction and inhabitation of ephemeral structures

in some areas of the site (ZUEP02) and the accumulation of windblown silt and sand deposits in others (documented in ZUEP01 and ZUEP03). Old, ruined buildings may have been partially reused or rebuilt, but the vast majority of the settlement was at this point deserted. Postholes associated with *tannūrs* and occupation surfaces suggest temporary structures (tents and/or palm-huts). This appears to immediately follow on from the destruction of the settlement in 1811, filling the gap between Phase 5 and Phase 3. Some structures or ruins may have been reused during this time, but the majority of the archaeological evidence was found in the form of non-stone architecture. The exact length of this phase is somewhat unclear.

### ***Phase III (1820-late 19<sup>th</sup> century)***

During this phase the inner settlement wall and towers were constructed and occupation appears to have been restricted to a much smaller area of the site (consisting of c. a third of the former settlement area). Architecture in this phase consists of walls built predominantly of beachstone with gypsum plaster facings, although limestone robbed from earlier buildings was reused. Courtyard houses appear to be the norm, although these now have fewer rooms (such as one of the compounds in ZUEP02).

This phase marks a re-settlement of Zubārah following the 1811 destruction. It likely represents a much longer phase of occupation than Phase V although it was less intense. It can be partially dated from the 1824 map of Captain Brucks (see Section 2), on which Zubārah is marked as ‘Zobara, extensive ruins’ and is described in his notes as “Small settlement amongst extensive ruins”.

### ***Phase II (Early 20<sup>th</sup> century)***

This phase is once again marked by abandonment and dilapidation. Only dry-stone wall windbreaks and enclosures appear to have been constructed during this phase, which represents some of the extant architecture clearly visible on the surface today (e.g. in ZUEP01 and ZUEP02). The archaeological signature reflects likely eclectic use of the site by fishermen or pastoral groups.

Phase II may post-date the destruction of the Qatar dhow fleet by British naval vessels in 1895 in the bay between Zubārah and the Ras Ushayriq peninsula, and corresponds to the final abandonment of permanent settlement in Zubārah.

### ***Phase I (Mid 20<sup>th</sup> century to present)***

The boundaries between Phase 1 and 2 are not easy to define chronologically. However, the construction of the pier and the road leading from the pier (documented in ZUEP03) clearly fall into this later phase. The construction of the road and the pier appear to have occurred sometime after 1958 and before 1977, as documented by aerial photographs of the site.

### 11.3.2 The ‘Palatial Compound’ and Social Stratification

Excavations in ZUEP04 have provided an initial insight into the lives of what we can fairly straightforwardly assume to be the upper echelons of Zubārah’s society. The excavations here revealed the remains of a large, defensive building, which included elements of decorative architecture. Many aspects of the excavations here points toward an elite lifestyle. Faunal remains from the adjacent midden indicate higher status food consumption, as the evidence for the higher number of sheep versus goat and the presence of hunted gazelle show (Appendix III). This is a significant difference to the other excavation areas investigated to date. The further study of the material culture will probably provide a similar perspective.

The ‘palatial compound’ is the first time QIAH has explored a large structure outside the area of the inner city wall. The size of the building, as well as strategic positioning along the southeastern edge of the city wall, show careful planning, suggesting that both the city wall and the compound were executed as part of a large scale city design in Phase V. Although we can identify the compound with high status living, excavations here also produced the remains of a *madabes*, which suggests that the production of date-syrup was a widespread activity, at least in elite and merchant households. Thus, domestic activities took place as a matter of course inside the ‘palatial compound’.

The compound was not only designed to impress – as the exterior plaster on the towers, the decorative architectural elements, as well as the size of the compound suggests– it also fulfilled utilitarian functions. Beyond the domestic activities, alluded to above, one gains a defensive, military impression from the structure. The corner towers were not only the largest thus far documented in Zubārah, but they were also strategically placed immediately behind the southeastern section of the city wall. Here, where the wall makes two bends around the compound, we would usually find towers placed on the city wall itself. In this case, however, the compound towers, situated behind the city wall, replace towers in the wall. At the same time, we find one city wall tower positioned exactly half way along the southeastern perimeter wall, providing the protection of three towers along a fairly short stretch of city wall. Written sources suggest that threats and attacks against Zubārah were a fairly commonplace occurrence. By providing some of the defence against attacks from the southeast, which may have been a particularly threatened segment of the settlements defences, the occupants of the compound may have sought to heighten their status and show symbolically, as well as practically, that they were the guarantors of safety and security for the settlement’s inhabitants.

Further excavations in ZUEP04 and other parts of the palatial compound will provide further critical insights into the use and function of this structure throughout Zubārah’s history. Work here will allow us to better understand the constitution of Zubārah’s society, by studying what we consider to be the buildings of Zubārah’s ruling family. This, however, will only make sense if we also continue to excavate other parts of the settlement, to compare and contrast these results against the wider societal backdrop.

### 11.3.3 Pearl fishing and trade

The pearl fishing and trading industry clearly had a profound influence on the emergence and development of Zubārah and its hinterland. Evidence for its importance can be found throughout the exca-



vation areas in the town. Tear-dropped shape diving weights are a common find, which were used by pearl divers to quickly descend to the pearl banks, as were stone anchors, which were found in various contexts in ZUEP01 and ZUEP02. Our excavations have revealed evidence for the multiple social strata that were involved in the pearl fishing industry and trade, from the wealthy mercantile elite who controlled the trade from their position as tribal leaders, to the merchants who acted as boat owners, financiers, trading agents, importer agents, and local supplier, to the craftsmen, shopkeepers, and ship captains, to the crewmen who manned the pearling dhows, herders who looked after the sheep, goat and camels, workers who built houses, defences and palaces, and fishers who supplied food to the everyday people in the town. In ZUEP01 we excavated the remains of what appear to be merchant houses. In ZUEP02 the work revealed evidence of what appears to have been commercial districts with some evidence for industrial activity, which will require further investigation. Evidence for tent camps or huts contemporary with the main occupation and major phase of architectural construction was found in ZUEP03. And excavations in ZUEP04 disclosed buildings likely occupied by the more important families of Zubārah whose initiative, organisational efforts and infrastructural improvements allowed the pearl fisheries and trade to prosper.

It is tempting to understand the now widespread evidence for the production of date syrup found in the form of multiple *madebes* installations in ZUEP01, ZUEP02 and ZUEP04, as a production system that acted in support of the pearl fishing fleets. The highly nutritious date syrup produced with them would likely provided an important supplement to the diet of pearl fishers and other mariners, who could expect to be at sea for several weeks at a time. Supplying and sustaining a large pearling and trading fleet, which formed the primary basis of Al Zubārah's economy, was very likely a key factor in food production, water procurement and the shaping of the local secondary and tertiary economy. As the work by Philip Macumber as part of this project (Section 5), as well as the excavations at Qal'at Murayr (Section 8), have shown, water was a key resource in this arid environment. Controlling access to water and providing a reliable fresh water source was not only a key element of survival in this harsh environment, but in the case of Zubārah was also a key infrastructural ingredient to keep the local pearl fishing and trading economy fuelled. That is why access to this crucial resource received significant protection. The two screening walls leading from Zubārah to Qal'at-Murayr likely served to protect the transportation of water from the wells situated inside the fort to the settlement and harbour. The large fort of Qal'at Murayr was situated in a commanding and strategically important location in the landscape, protecting several wells inside its walls and nearby. Food supplied from the hinterland also played a significant economic input. Although fish was a major constituent of the diet, sheep and goat was not an unimportant source of meat. Dates were likely also grown locally. Our regional archaeological and geomorphological survey (Sections 5 and 9), as well as written sources (Section 2). This enabled Zubārah to support a sizeable pearl fishing and trading fleet, resulting in the import of numerous elements of material culture. This contrasts with the findings of Carter (2005).

Ultimately, though, it seems that various factors, both economic and political, conspired against the sustainability of Zubārah's economic regime. The need to transport water from as far as 1.6 km away to the harbour and settlement must have placed somewhat of a strain on the local supply infrastructure. The time and effort required to supply and resupply *dhows* must have sooner or later become one factor in the calculation of profit margins. This was likely amplified by Zubārah's shallow harbour, which does not allow larger vessels to come close to the shore and would thus likely have to be

resupplied by smaller, shallow boats. This would have added yet more time and expenditure to economic balance sheet.

Ecologically the local environment would have likely also struggled to support a fairly substantial population in Zubārah, which would have also expanded temporarily during the annual pearl fishing seasons. Migrant Bedouin may, at these times, have come to Zubārah to find employment on the pearling dhows as divers, crew members or to participate in the local secondary or tertiary economy (Bowen 1951, 169). The presence of a constant, large population, in a region that had difficulty providing sufficient resources for anything like a similarly sized population beforehand, as well as periodic presence of a seasonally migrant population, must have put a strain on both available food and water resources in Zubārah's hinterland.

It seems then that it was not only political pressures that led to Al Zubārah's gradual demise as a key settlement location important for pearl fishing and trade. Economic, and perhaps even ecological factors, also played an important role.

#### **11.3.4 Al Zubārah's Hinterland**

The question of sustainability and maintaining Al Zubārah's economy suggests that there is a profound need to continue the investigation of Zubārah's hinterland. There has been a general argument that pearl fishing and trading settlement's such as Zubārah were primarily reliant on an import-export economy based on income derived from the pearl trade (e.g. Carter 2005). The regional survey reported here (see Sections 5 and 9), as well as the excavations at two major sites in Zubārah's immediate surrounding (Qal'at Murayr and Furayhah, Sections 7 & 8), have begun to show that the hinterland likely had a much more important economic input into the local economy.

Where Qal'at Murayr protected a key water resource, the regional survey has shown that a number of pastoral camp sites existed in the vicinity. Although these are ephemeral occupations and difficult to date for lack of material culture remains, several settlements in Zubārah's hinterland appear to be contemporary and likely acted to supply the town with food and water. One interesting such site, identified by Philip Macumber, is the large area of enclosures and field systems near Al Jumayl (see Section 5). This large site, which measures c. 100 hectares in maximum extent, is a concentration of wells, enclosures, earthworks, and a series of buildings (including the remains of potentially one fort or fortified compound measuring c. 20 x 20 m). Although also not securely dated at present, it may represent a site where livestock was kept and reared on a large scale to support the local demand of sites such as Zubārah. Another similar site is Muhayriqat near Helwan, situated much closer to Zubārah, where similar earthworks form enclosures likely for the keeping of livestock. And closer yet, our survey has identified similar enclosures around Qal'at Murayr (see Section 7).

Pearl fishing and the trade in pearls therefore seem to have had a profound impact on the local landscape within Zubārah's hinterland. Some of the ideas above undoubtedly need to be further examined and tested as work progresses, but there is reason to doubt that the economy of these pearl fishing and trading settlements was exclusively or primarily based on an export-import economy. While this was clearly the primary means to generate income, our work appears to show that the economy was much more multi-layered, and included multiple actors and stakeholders. The hinterland of these set-

tlements, at least from the perspective of Al Zubārah, must have played a key role in this, providing critical support not only for the settlement's inhabitants, but also to actually support the primary economy of the pearl fishing and trade. The 'Utoob founded not just a settlement at Al Zubārah, but their arrival also had a profound impact on the local landscape. This ought to cause us to reconsider the manifold ways in which pearl trading and fishing did not just affect the history of the 18<sup>th</sup>-19<sup>th</sup> century 'city-states' and proto Gulf region national entities, but also how it had wider effects on hinterlands and regions along the coast, affecting also not just urban populations, but local groups and tribes, their livelihoods and histories.

### **11.3.5 Zubārah's Importance**

There are various inter-connected elements of archaeological research that highlight Al Zubārah's importance beyond the local or national level. Generally speaking, research on Late Islamic urban archaeology is woefully underdeveloped in comparison to other periods following the adoption of Islam, particularly in the Gulf. Working at Al Zubārah provides a step forward in our understanding of urbanised settlements and spaces on the verge of modernity in the Gulf, which was a critical period in the constitution of the modern nation states in the region (Fuccaro 2009). As such, work at Al Zubārah provides critical insights into the character of Late Islamic urban structures and societies, and into their development. It acts not only as an important supplement to the scarce written record, but also opens up opportunities to examine elements of the urban society not commonly disclosed by other sources. Evidence for the discovery of temporary tent camps contemporary with the main phase of occupation in Al Zubārah provide an insight into the social strata of these urbanised communities. Furthermore, this is a basis on which to reconsider and better understand these communities economic and social histories, which also played a key part in the formation of national and local identities and economic regimes to the present day.

Al Zubārah is a key location where such research can be carried out. This is because the site was subject to a 'Pompeii effect'. The main phase of occupation at Al Zubārah lasted for less than fifty years, and this main phase was the result of a strategic execution of a specific urban design. The layout and plan of this design are preserved at the site, as QIAH's extensive topographic surveys have shown (Bille 2009). With the destruction and subsequent abandonment of the settlement in 1811 little of this historic, urbanised fabric was disturbed by later occupations and developments. In essence, it became fossilised. It is one of the very few places in the Gulf where this is the case, as in many other cases later development of the modern urban fabric has destroyed or displaced the original layout and shape of settlements. Al Zubārah therefore is a lucky break for urban archaeologists trying to understand this formative, key period in the region's history. Further work at the site promises to capitalise on the unique opportunity the site provides to better understand this key period, the social and economic relations amongst its actors, and the critical role played the interplay between politics, social strategies, economic activities, ecology and environment.



## 11.4 Recommendations

To conclude this report we put forward a number of key recommendations for the further work at the site that stem from our Stage 2, Season 1 fieldwork at Al Zubārah, Murayr, Furayhah and the wider hinterland.

Work in key locations inside the settlement of Al Zubārah has to continue. This includes in particular compound 2 and 3 in ZUEP01 to enhance our understanding of ‘merchant-class’ buildings in this sector of the town. It also includes in what we suspect to be the commercial district in ZUEP02, which will provide key information on the economic activities of Al Zubārah’s inhabitants. From this area a connection should be made from our excavations to the QMA excavations in the *souk* to the north. Finally, excavations in ZUEP04 should continue and should be expanded to reveal more about this fascinating structure in the southeastern area of the town. Here, excavations could also cut into some adjacent structures to clarify their relationship to the main ‘palatial compound’.

Both the archaeological and geomorphological work near and around Al Zubārah has to carry on to continue to detail Zubārah’s hinterland. This will critically enhance not just the historic environment record in this part of Qatar, but will also significantly enhance our understanding of Al Zubārah’s historic landscape. Work by Dr Philip Macumber will also continue to highlight the unique parameters provided for by Qatar’s physical topography and environment that imposed important modifications on the socio-cultural and economic history of the region.

Excavations at Furayhah have only begun to scratch the surface of the history of this important settlement, with evidence suggesting that it’s origins may date back to the 17<sup>th</sup> century. Further work here will provide information on its history and development, in particular during the key time period of Al Zubārah’s main phase of occupation.

Excavations at Qal‘at Murayr have shown the great potential this site has. In part, it is much better preserved sub-surface than the lack of upstanding remains would suggest. Although further excavations at the site are not required at present – with adequate fences being constructed to provide protection – further work here could proceed by using the latest, state-of-the-art geophysical survey methods and small scale archaeological interventions to better understand sub-soil survival of archaeology and to recover crucial dating evidence.

Crucial site protection measures now have to be implemented to protect and preserve the crucial archaeological resources at Al Zubārah and the hinterland, using fences and restrictions of access. Vehicle traffic and access to Al Zubārah, Murayr and Furayhah has to be restricted to protect the fragile archaeological remains at these sites. Guards should be employed to enforce the protection of these sites, with fences restricting the physical access.

QIAH’s conservation program will, following the initial tests and experiments as part of this season, play a more critical role in the years to come, as excavated remains will be protected and conserved to provide a visual representation of the site to visitors

The latter will go hand in hand with further outreach and publicity work to highlight Al Zubārah’s importance and crucial representation of one of the region’s best surviving examples of an 18<sup>th</sup>-19<sup>th</sup> century pearl fishing and trading settlement

## 12. Bibliography

- Bibby, G. 1969. *Looking for Dilmun*. New York: Knopf
- Bille, M. (ed.) 2009. End of Season Report, Qatar Islamic Archaeology and Heritage Project. Vol. I. Unpublished Report: University of Copenhagen and Qatar Museums Authority
- Bowen, R. LeBaron. 1951. The Pearl Fisheries of the Persian Gulf. *Middle East Journal* 5 (2), 161-180
- Brucks, G.B. 1865. Navigation of the Gulf of Persia. In Thomas, R.H. (ed.) *Arabian Gulf Intelligence. Selections from the Records of the Bombay Government. Concerning Arabia, Kuwait, Muscat and Oman, Qatar, United Arab Emirates and the Islands of the Gulf*. Pp.: 531-580, London: Oleander Press
- Burns, S.J., Matter, A. Frank, N. and Mangini, A., 1998. Speleothem-based palaeoclimate record from northern Oman. *Geology* 26, 499-502
- Burns, S.J., Fleitmann, D., Matter, A., Neff, U and Mangini, A., 2001. Speleothem evidence from Oman for continental pluvial events during interglacial periods. *Geology*. 29 (7), 623-626
- Carter R.A. 2005. The History and Prehistory of Pearling in the Persian Gulf. *Journal of the Economic and Social History of the Orient* 48 (2), 139-209
- Cherkauer and MacKereghan, 1991. Groundwater discharge to lakes, focusing on embayments. *Ground Water* 29 (1), 72-80
- Eccleston, B.L, Pike, J.G and Harhash, I 1981. The water resources of Qatar and their development, Technical Report No. 5. Ministry of Agriculture, Water Resources and Agricultural
- Evans, G., Kirkham, A. and Carter, A.K., 2002. Quaternary development of the United Arab Emirates coast: new evidence from Marawah Island, Abu Dhabi. *GeoArabia* 7 (3), 441-458
- Evans, G., Schmidt, V., Bush P.R. and Nelson, H. 1969. Stratigraphy and geological history of the sabkha, Abu Dhabi, Persian Gulf. *Sedimentology* 12, 145-159.
- Hakima, A. 1965. *History of Eastern Arabia 1750-1800. The Rise and Development of Bahrain and Kuwait*. Beirut: Khayats
- Khalifa, A. and Hussain, A. 1993. The 'Utoob in the eighteenth century. In Khalifa, A. and Rice, M. (eds.) *Bahrain Through the Ages: the history*. London: Paul & Kegan

- Lloyd, J.W., Pike, J.G., Eccleston, B.L and Chidley, T.R.E. 1987. The hydrology of complex lens conditions in Qatar. *Journal of Hydrology* 89, 239-258
- Lokier, S and Steuber, T. 2008. Quantification of Carbonate-Ramp Sedimentation and Progradation Rates for the Late Holocene Abu Dhabi Shoreline. *Journal of Sedimentary Research* 78 (7), 423-431
- Lorimer, J.G. 1908. *Gazeteer of the Persian Gulf, Oman and Central Arabia. Volume 2: Geographical and Statistical Data*. Calcutta
- Macumber, P.G., 2009. Preliminary report on the geomorphology and hydrology of the Al Zubarah region, northern Qatar. End of season report, 2009, Vol II, Qatar Islamic Archaeology and Heritage Project
- McBride, M.S. and Pfannkuch, H.O., 1975. The distribution of seepage within lakes. *U.S. Geol. Surv. J. Res.* 3, 505--512.
- Ortlieb, L. 1991. Quaternary shorelines along the northeastern Gulf of California: Geochronological data and neotectonic implications. *Geological Society of America Special Papers* 254
- Puls, D., Richter, R., and MacDonald, I., 2008. A traverse across Umm Tays Preserve. Sediments and biota in a dynamic tidal region. *Qatar Geological Society and Qatar Natural History Group*, April 2008
- Rahman, H. 2005. *The Emergence of Qatar. The Turbulent Years 1627-1916*. London: Thames & Hudson
- Schofield, J. (ed.) 1980. *Archaeological site manual Part 1, the written record*. London: Museum of London
- Taylor, J.C.M and Illing, L.V 1969. Holocene intertidal calcium carbonate cementation, Qatar, Persian Gulf. *Sedimentology* 12, 69–107
- Warden, F. 1865. Uttoobee Arabs (Bahrein). In Thomas, R.H. (ed.) *Arabian Gulf Intelligence. Selections from the Records of the Bombay Government. Concerning Arabia, Kuwait, Muscat and Oman, Qatar, United Arab Emirates and the Islands of the Gulf*. Pp.: 362-465, London: Oleander Press
- Williams, A.H. and Walkden, G.M., 2001. Carbonate aeolianites from a eustatically influenced ramp-like setting: the Quaternary of the southern Arabian Gulf. In *Modern and Ancient Carbonate Aeolianites: Sedimentary Sequence, Stratigraphy and Diagenesis*. SEPM Special Publication 71, 77-92



Williams, A.H. and Walkden, G.M., 2002. Late Quaternary highstand deposits of the southern Arabian Gulf: a record of sea-level and climatic change. *Geological Society of London. Special Publications* 2002, Volume 195, 371-386



